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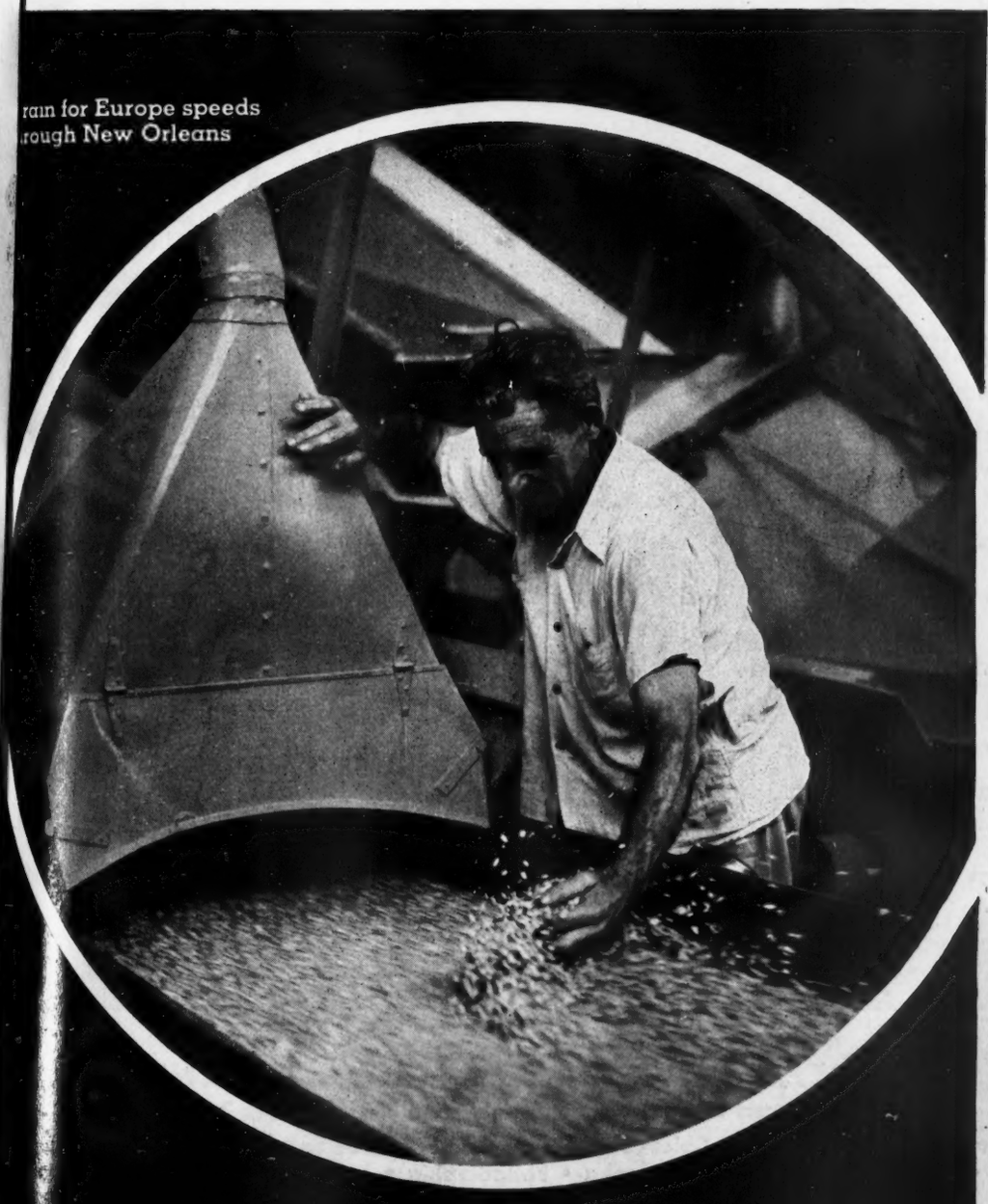
FOOD INDUSTRIES

● FOR THOSE WHO CONTROL QUALITY HROUGH MANAGEMENT AND PRODUCTION



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JULY 1946

Mr. Baker—Why N
A Technologist?

New Products
Used In Candy

Ice Bank Reduces
Refrigeration Load

Pack-Coding
Avoids Grief

Improve and Test
Your Own Package

Scale Prevention
In Bottle Washing

Meat Industry
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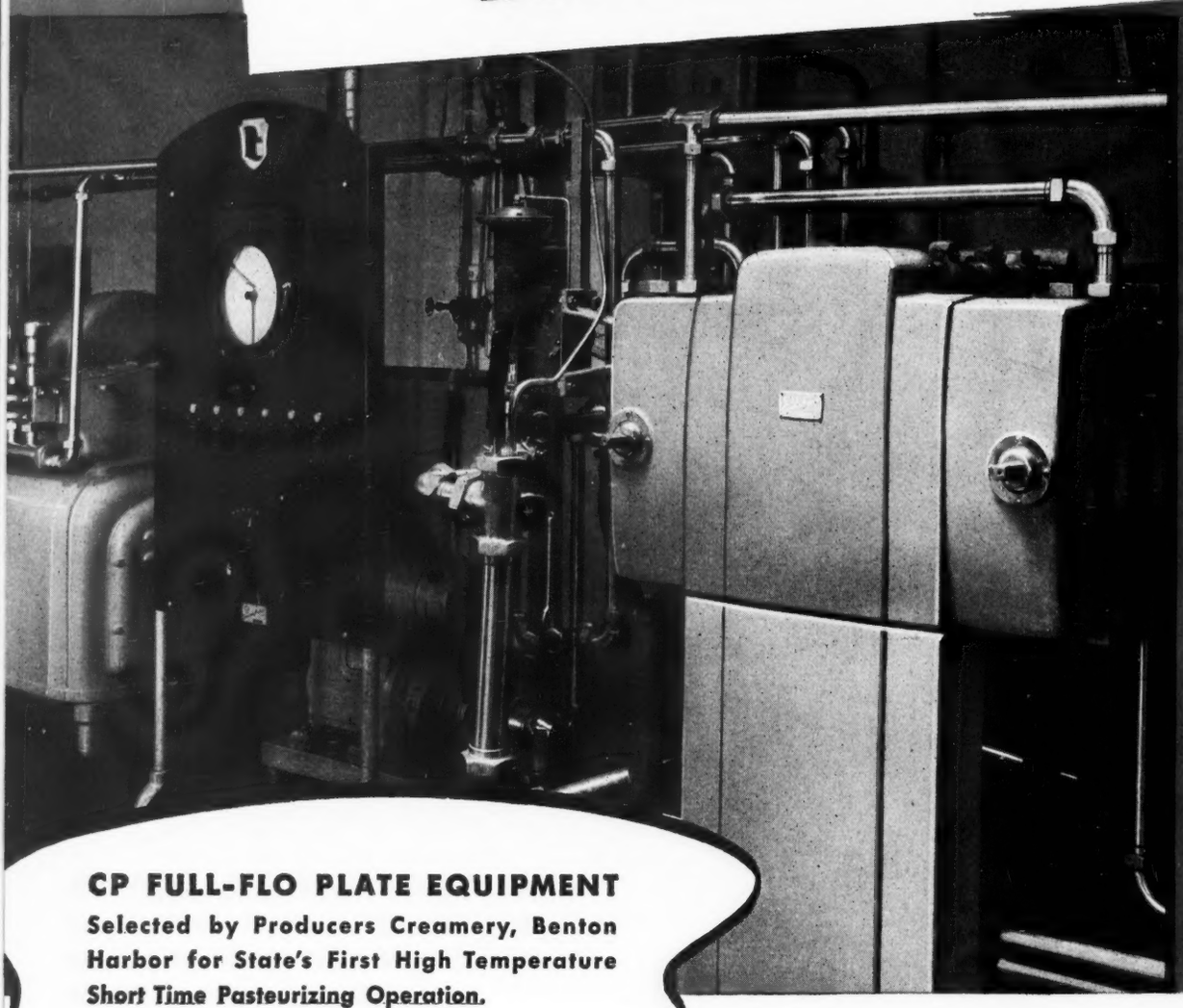
Michigan Joins the Swing to HTST PASTEURIZATION



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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

JULY, 1946 Volume 18, Number 7

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THE COVER

Grain for the famine threatened countries is being examined on the conveyor belt as it flows into ships at New Orleans. This elevator handles wheat, oats and corn from the Midwest. *(Press Association photo)*

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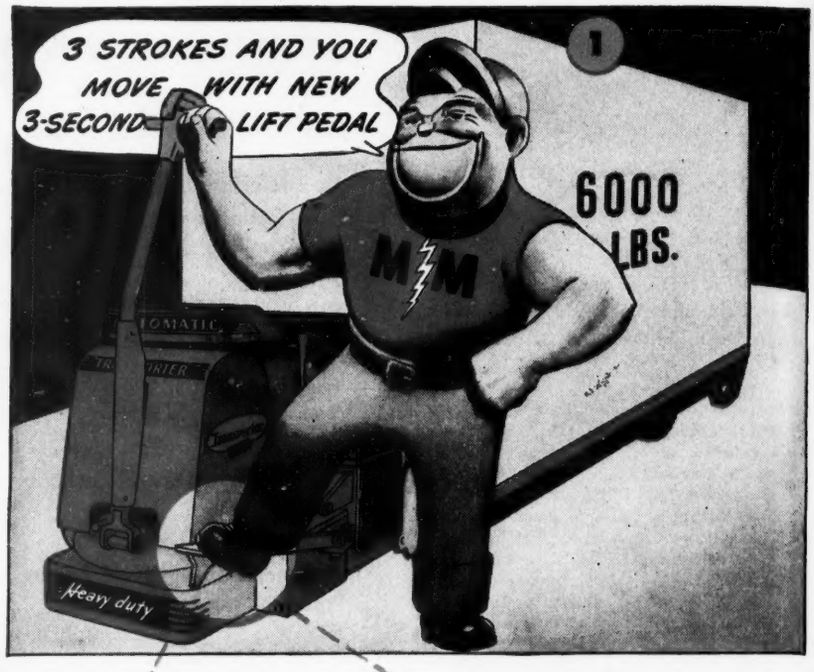
Amazing New Postwar Transporter Lifts Loads Faster... Moves Loads Easier!

Adds New Efficiency, Longer Life to Miracle Electric Truck

Yes, you get more—much more in the amazing NEW, POSTWAR TRANSPORTER—the miracle electric truck long famed for cutting handling costs in half and taking the work out of every material moving job.

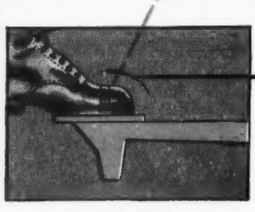
Astounding new money, time and work saving features have been added. Developments that lift loads faster, move them easier, give longer life and greater efficiency to a unit already noted for energy-saving performance.

With practically everything new but the hardware, the features below only highlight what you will get in the 1946 Transporter. Send the coupon. Get *all* the facts, before you decide on any motorized hand truck.



2 EASY TO GET AT POWER UNIT

Changes in design have been made, so that all parts of the power unit are easily accessible. The wiring system has been simplified, and component parts compactly placed where they can be reached easily for lubrication, and inspection.



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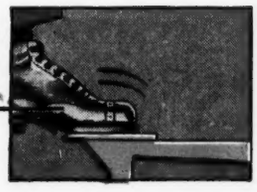

"TOUCH-OF-YOUR-THUMB" EASE, *says*..."*MUSCLE MIKE*"

The new 3-second Lift Pedal contains two pistons or cylinders, the high pressure (low speed) cylinder being housed inside the low pressure (high speed) piston. Both cylinders are actuated by the cam when the foot pedal is depressed. One stroke of the foot pedal is all that is required to engage skid.

When load resistance is encountered, the fluid from the larger or low pressure cylinder by-passes back into the reservoir, and the high pressure cylinder is employed to raise the load. So the first stroke of the foot pedal engages the load, and two more strokes raise the load sufficiently to move.

3 NEW SAFETY BRAKE

Complete "dead-man" control is assured by a double shoe external contracting type larger diameter brake, which provides four to five times more braking effort. This gives you a Positive Mechanical Brake more efficient and safer the instant control handle is released to upright position.

FOOT PEDAL HINGES BACK FOR SHORTER TURNING RADIUS

To provide a shorter turning radius, the foot pedal is hinged back when not in use for lifting.

4 Double-Pitch Reduction Chain Drive Prolongs life of unit.

5 New Magnetic Contactor Utilizes Silver Alloy Tips to give ten times more life.

6 Carbon Brushes in Commutator Type Collector Ring Replace Copper Fingers to eliminate lubrication, increase wearing quality.

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LOOK TO THE LEADER FOR ALL THAT'S NEW

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Time to Educate the Public

WITH all the rough treatment being handed to the food processing industry today, isn't it about time for a concerted effort to really let the public know what's happening?

The industry, instead of being apologetic about shortages and shutdowns, has a rare chance to capitalize on the situation by telling the world about the sacrifices it is making, about the unhappy people it has had to lay off, about its strenuous efforts to supply food to the population despite obstacles, dearth of substitutes, or disappearance of substitutes-for-substitutes.

Consumers Steal the Show

Food is front page news in every daily newspaper, but the stories are always about shortages, people standing in line or, more often, fighting to get close to a grocer's or butcher's counter. Or, somebody is damning a baker because he uses his limited supply of ingredients to make the longest possible profit in the hope that he won't go broke before the emergency ends. Or, someone cusses out an ice cream maker because he has refused to lose money by converting his cream into butter under the ruinous price ceilings. It is seldom that the processor gets any credit, sympathy or understanding.

Has anybody made it clear to the public that the government has made itself the biggest black market buyer in the country? If you or I want to buy grain we can't legally pay more than the ceiling price, but the government can—and does!

With flour mills about 75 percent shut down in June, does the public realize how many family incomes are cut off? Will the man in the street understand how a shortage of starch can cripple many branches of industry?

There never was a better time for some sound popular education in the facts of life and the food processing industry. For some obscure reason, the bulk of our population believes it has a moral right to get its food at prices below cost, or certainly not above actual cost. And most people believe that it is eminently fair and proper if they can get it below cost. They will reach up and willingly pay profitable prices for the niceties and luxuries of life. They will scheme and plot and save in order to buy a radio or motor car, but where sheer necessities are concerned—ah, that's different. So we have had OPA and food subsidies, and people don't have to pay out what their food actually costs, or so it has seemed at the time.

Something strange is behind all this. Society does not condemn the stealing of food for a hungry family. Many an honorable man has excused the stealing of food to satisfy hunger. Yet, if he steals a watch to know the time, or an auto if he wants to ride, or liquor to slack his thirst, he has transgressed the moral code. He needs the food: he does not need the others. That's what makes the difference.

Sense of Dramatic Needed

Unfortunately there is little glamor associated with business, especially in this time of so-called peace. A food plant shut down for lack of raw materials is usually less newsworthy than a hundred women fighting for bread, meat or nylon stockings.

Mere announcements will not suffice. There must be enough drama in the food processor's story to compete with the spectacle of housewives clamoring for food.

There are ways of letting the public know what is really going on. At least one food company, Pillsbury Flour Mills, is alive to them. Its pictures of closed factories are of such high quality that hard-boiled managing editors of city dailies are anxious to publish them. The press services consider the photographs "hot" enough for transmission across the country by wire.

No Time Like the Present

Now is the time for the processors to act, while the shortages are acute. In this, there is no thought of exploiting the tragedies overseas or the troubles at home. The processors can indeed perform a service for consumers everywhere by exposing the fallacies and playing up the consequences of the quotas, subsidies and controlled prices.

Some day the food pipelines leading overseas will be shut off—probably suddenly. That will end the present golden opportunity to drive home to the American public the true worth of the industrial processing of foods. The needed educational campaign is properly a job for the trade groups and national associations in the food field. Let them make the urban populations fully conscious of the sources of their food supplies.

L. V. Burton EDITOR

The Talk of the Industry

• AFTER contemplating all the grief of the past few weeks, with one strike following another in basic industries, our esteemed friend, Professor G. Helpus, has proposed that Congress enact another law. The law is to set aside two consecutive weeks in every year to be known as National Strike Weeks. Everybody is to quit work those weeks, both strikers and non-strikers. The strikers will be on strike and minus pay. The non-strikers will be on vacation with pay. No strikes will be permitted at any other time.

All stores will be closed. All railroads will stop running. Everything will be as dead as the bluest Sunday you ever saw in the Bible belt. Nobody can have any fun, get a drink, go to a movie, or go elsewhere. "The non-strikers," says the Professor, "will be striking against the strikers really and giving them a dose of their own medicine."

When last he looked in on us, Professor G. Helpus was trying to decide which pair of weeks in any year could see a national shutdown without ruining our whole economy.

• RALPH SANBORN, of California Packing Corporation, calls our attention to "moral" instead of oral testimony on page 130 in the March issue of *Food Industries*. He is happy to note that the Federal Security agency is proposing to elevate the esthetic plane of hearings on food standards.

• WAR is generally considered a total loss to all concerned, but the outstanding exception appears to be a meat packing plant in Surabaya, Java, owned by a British firm. When the Japs occupied the Dutch East Indies, the plant was written off as a total loss of £65,000. But after the islands were liberated, the owners discovered that the Japs had modernized and enlarged the plant. It was then reinstated on the books of the corporation at £100,000. (You would only do that where there is no tax on capital gains.) According to our information, the modernization job was surprisingly well done, especially for a Japanese enterprise.

• AMONG the postwar wonders of the world none exceeds the spectacular claims made for helium as a preservative for food. Up to now we have not seen any evidence to show that it is a preservative, but we have heard some tales about accelerated spoilage where it has been tried.

• CHESTER BOWLES has developed the thick hide that is necessary for a man in public life when he can take it and show no wrath. Representative August H. Andresen, of Minnesota, is quoted by the American Butter Institute as saying: "Mr. Bowles has fostered and legalized the black market in butter. One would think he is a member of the oleomargarine trust, which group is feverishly working to stop all butter production in the United States."

Come, come, Mr. Andresen. Who makes the laws, Mr. Bowles or Congress?

• AGITATE, agitate continually, keep things in an uproar, never allow anything to remain settled—that is the technique of the Communists, both here and in international affairs. This technic is applied only until the Commies get actual control. After that, acting or speaking out of turn, means the end of the offender. How about doing a little counter-agitating of our own?

If you are an operator of an independent food processing plant of medium size, you are no doubt making plans for the more competitive days ahead. Are you really convinced of the contribution a food technologist can make? Are you satisfied that his salary and upkeep can be an investment paying dividends? Although dealing with the postwar problems of a baking concern of medium size, the article on the opposite page applies in principle to any smaller food plant. It tells what may be expected from a staff of one or two working in a laboratory equipped for $3,000. You can help your sales through improved flavor and keeping quality. You can effect economies.

Hors d'Oeuvres

• Anheuser-Busch's Brewery Sales Division Bulletin No. 14 is a factual report of the Anti-Saloon League's convention, in St. Petersburg, Fla., last winter. There have been no reports, as yet, on the A-SL's reactions to this exposure to fresh air.

• *The West Indian cherry is reported to have 34 times as much vitamin C as an orange. At last, we have a reason for increasing our Manhattan cocktail intake.*

• An exporter in Adelaide, So. Australia, is filling an order for 500,000 rabbits' feet, for a Toronto firm, at the rate of 20,000 per week. To date, front feet have comprised less than half of the shipment. We'd expect rabbits to measure up in production, but that uneven supply is rather startling.

• *Turkeys on the Shag-Roy farm, Millerton, N. Y., says our favorite group of electrical manufacturers, will be spared the ignominy of the axe, this Thanksgiving. They will be electrocuted by a machine that kills them in 5 to 15 seconds with 450 volts. No reason why cows should get all the morale building inventions.*

• The butter industry is getting more and more indignant at government sales restrictions. But, when you tell this to the margarine people they just stare at you.

• *The Coaltoter Conveyor Co., Chicago, has changed its name to Material Movement Industries. Postwar expansion, maybe.*

• A year's milk suply from all the cows in the U. S., says Borden's. would fill a lake 75 miles long, 150 ft. wide and 31 ft. deep. Even a "water" lake of these dimensions would be worthy of note.

• *B. F. Goodrich Rubber Co. anticipates a rubber surplus before long. So they are said to be planning "billowy rubber mattresses" for dairy barn stalls to replace the old-fashioned straw. If this keeps up, Carnation is going to have to serve breakfast in bed to meet the contentment competition.*

J. A. J. J.

The laboratory for a medium-sized baking plant need not be elaborate. It could be equipped for rather extensive work for about $2,500. It should be large and well-ventilated.

WHY NOT A TECHNOLOGIST, MR. BAKER?

Medium-sized independent bakers will need imagination and know-how to overcome the anticipated postwar drop in demand for bakery products. The investment proposed here might give them the edge needed to hold their markets

By W. R. VAN METER, Kingston, Pa.

ESTIMATES indicate that the volume of bakery products sold has increased about 40 percent since prewar years. It is anybody's guess how much of that increase is likely to be held by the baker once the housewife has ready access to sugar and shortening again, extra time on her hands, and possibly a maid back in the kitchen. Certainly some drop in volume is likely. It is probable, moreover, that the drop will not be spread evenly over all groups of bakers—the chain-store bakers, the large interstate bakers, the medium-size independent bakers, and the small retail bakers—but will hit some hard and barely touch others. In the opinion of some competent judges, the group most likely to experience the severest drop in volume are the medium-size independent bakers, who are either too small to afford a good technologist, or at least feel they can't, because as yet they have not come to realize that the salary of a technologist is a dividend paying investment.

The chain-store bakers and the large interstate bakers are building up their technological departments for postwar competition. The small retail bakers have an excellent association working in the same direction for them. The medium-size independents, on the other hand, are not in the position of any of these groups. Lacking an alert technologist in their plants, the independent bakers will be unduly handicapped in the competition that is certain to develop, for they will need first-hand technical advice, help and skill to meet their problems. They will require first rate technical departments every bit as much as they will need an efficient, hard-hitting sales department.

It is therefore the intention of the writer to discuss:

1. Why the independent baker needs to put a technologist on his staff.
2. What work the technologist can do to bring profit to the baker.
3. What equipment and personnel are necessary for starting a baking plant laboratory.
4. What qualifications and abilities

are needed in the technologist who undertakes to run a plant laboratory for the baker.

5. What responsibilities top management must shoulder if the technologist in the baking plant is to achieve maximum success and profit for the employer.

Assuming that the bakery already employs several skilled bakers in a supervisory capacity in the production department, it will certainly be asked by most owners of the medium-size independent group why any technologist is needed. The owner will point out that his head baker is a highly skilled man and therefore should logically be expected to be the man to create new ideas, to improve products and to devise better means of quality control. To most of which, the head baker himself will more or less modestly acquiesce.

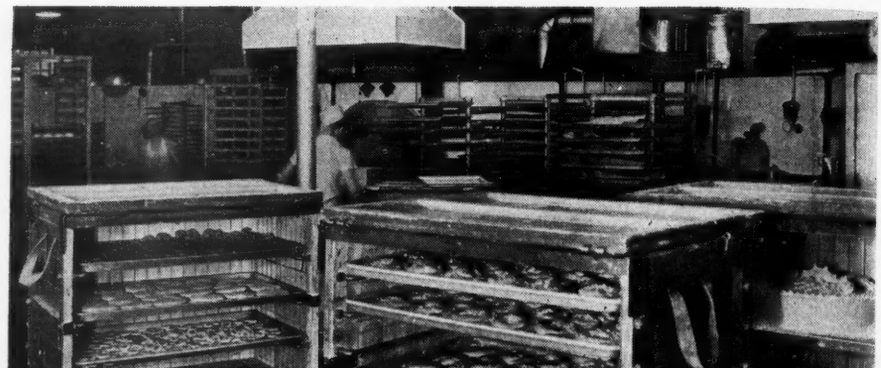
The only answer that can be made to this line of reasoning is that it just doesn't seem to work out that way. A case in point might be the automobile industry, whose phenomenal progress certainly has rested more upon the achievements of its technical staff than upon the skill of individual shop master mechanics. Or take the meat packing industry as a case closer to home.

Bakers Are Overworked

Actually, though in justice to the skilled baker, it should be pointed out that his present position in the industry allows him very little chance to do the work of the technologist. Bakers generally are so overworked, so harried by many pressures to meet production schedules, that they rarely have the time or the inclination for the sort of critical, thoughtful examination of their procedures that will yield results.

As a group, their grounding in mathematics, physics and chemistry is scanty, and their general education is very much the same, with the result that they are not overly good at developing ideas outside the traditional baking practice in which they received their early training. With both fingers crossed, and the left hind foot of a rabbit, caught in the dark of the moon, tucked away in his pocket, the writer of this piece sincerely and earnestly hopes that nothing said here will be construed as criticism of the bakers, but the plain truth is that the bakers simply can't do the job of the technologist. The baker needs the technologist, and vice versa.

By virtue of his educational background, by his cultivation of a critical and inquiring attitude toward what he sees, and by the nature of his position in the organization, which leaves him free to exercise those faculties, a capable technologist is very likely to be of unusual value to a baking plant in the competitive days ahead. The influence of his work should be felt at a great many points both inside and outside the organization that employs him.



Listed among the improvements brough by the bakery technologist are the new and different types of baked goods that are not duplicated by the products of other companies.

Function of the Technologist

The work of the technologist in the bakery, and his value to the organization, will probably fall into the following classifications:

1. The effect on sales of the company's products, which will come about through improvements made in the eating and keeping quality of the product. This the technologist can do in the following ways:

(a) Instituting quality control measures that will make for a more uniform product; (b) controlling the flavor of the product by a regular tasting program; (c) development of quality raising improvements in the way of handling standard ingredients; (d) invention of materials for improvement of keeping quality; (e) building up a body of actual knowledge through incubator and cabinet keeping tests of the characteristics of the company's products, volume tests and the like, so that the effects of ingredient or processing changes can be accurately known, rather than merely guessed at; (f) acting as a screen for the enthusiastic potential sales managers who come in with the latest wonder development, "hot off the griddle," and for whom one laboratory-supervised baking test quickly separates the wheat from the chaff; (g) setting standards for guidance of purchasing department on product ingredients and testing incoming raw materials to keep up to standard; and (h) using his influence to inculcate a feeling for good, flavorful baked food as part of the organization's attitude to its work.

2. The effect on production costs of the company's products, which should be decreased by these phases of the technologist's work—and it should be pointed out that frequently a drop in production costs can be used to make selling problems easier:

(a) The development of new procedures, or new materials that either decrease the cost of batters, fillings and icings while maintaining quality standards, or eliminate labor from some stages of the operation. Where needed, recommendation of the proper machines is certainly within this part

TABLE I—Basic Tools for Baking Plant Laboratory

Elconap incubator A-3
Despatch baking oven No. 92
Tyler portable sieve shaker and set of sieves ranging from 65- to 200-mesh
Barnstead still, 1 gallon per hour capacity
Hobart mixer
Waring blender
Electric refrigerator with as large capacity as will fit in laboratory
Weber electric drying oven
Weber electric vacuum oven and Cenco Hyvac pump
Muffle furnace
Beckman pH meter, industrial model M
Troemner analytical balance
International clinical centrifuge
Lightnin' mixer, laboratory size
Eastern Electric midget pumps
Bausch & Lomb microscope with accessories
Kjeldahl digestion and distilling unit

of the technologist's responsibilities; (b) the adjustment and testing of product formulas to make certain that the best job is being done for the money that is being spent. This does not mean skimping on the quality of the ingredients. Rather, an illustration would be the case the writer heard of concerning the new bakery technologist who found that his employer was using an expensive flour in one product.

Various reasons were given for the necessity of using this particular flour and no other for successful formulation of the product. Actually, however, as the technologist found, the essential characteristic of the expensive flour was its unusually great water absorption value. When this was known, another and considerably cheaper flour of the same water absorption value was found and thereafter used quite successfully; and, (c) keeping posted on the new raw materials that appear and that may have a place in the company's products with consequent saving.

3. Development of new and different products within the bakery's general field. In this category would be baked goods not duplicated either in special characteristics or even in type by the products of other companies. There is considerable room here for the technologist to use his imagination and creative talents. While admittedly, from the employer's angle, this sort of development research can be like playing the Daily Double, it should still be remembered that even the chocolate-coated ice cream was once just an idea in somebody's mind.

The laboratory for a medium-size baking plant does not need to be elaborate. It could be equipped for rather extensive work for about $2,500 to $3,000. Were it desired to limit the scope of the work to be done, this figure could be reduced.

Locating the Laboratory

As roomy a place as possible should be chosen for the laboratory. It should also be kept in mind that due to the ovens and burners normally operating, the laboratory is likely to be a hot place and therefore its location should be such as to minimize the effect of this heat. It should be put on the shady side of the building, for example, and if at all possible, cross ventilation should be arranged for. An adequate number of fans should be allotted to the laboratory.

There should be a good exhaust system for carrying off the fumes of protein determinations and the like. The laboratory should positively have windows along at least one wall, if not two, for the writer is no friend of the modern industrial designer who inhumanly omits windows from his buildings. Parenthetically, it seems like a strange quirk that in the early days of the Industrial Revolution, factory buildings had only tiny, smoke-blackened windows through which little daylight ever penetrated, and now, thanks to the advanced design of the middle 1900's, we have progressed to the point of having neither daylight nor windows in the best modern factory buildings.

The writer has found the equipment listed in Table I particularly useful as basic tools for a baking plant laboratory. The list is given with no thought that it is all inclusive, or that the particular items mentioned are the best of their kind. Nothing of the sort is implied. The intention is merely to note, out of some years of experience, those items of equipment that have been frequently, and satisfactorily, used in a baking plant laboratory.

Some Items Costly

It goes without saying that these are the expensive items, and that, of course, glassware, thermometers, hydrometers, pots and pans, reagents, office furniture and various other supplies are also needed. There have also been times, when dealing with special work, when the going would have been made easier if the laboratory possessed several other pieces of high-cost equipment such as a Sharples super centrifuge, a small filter press, a chopper for foods and a refractometer.

TABLE II—Library for the Laboratory

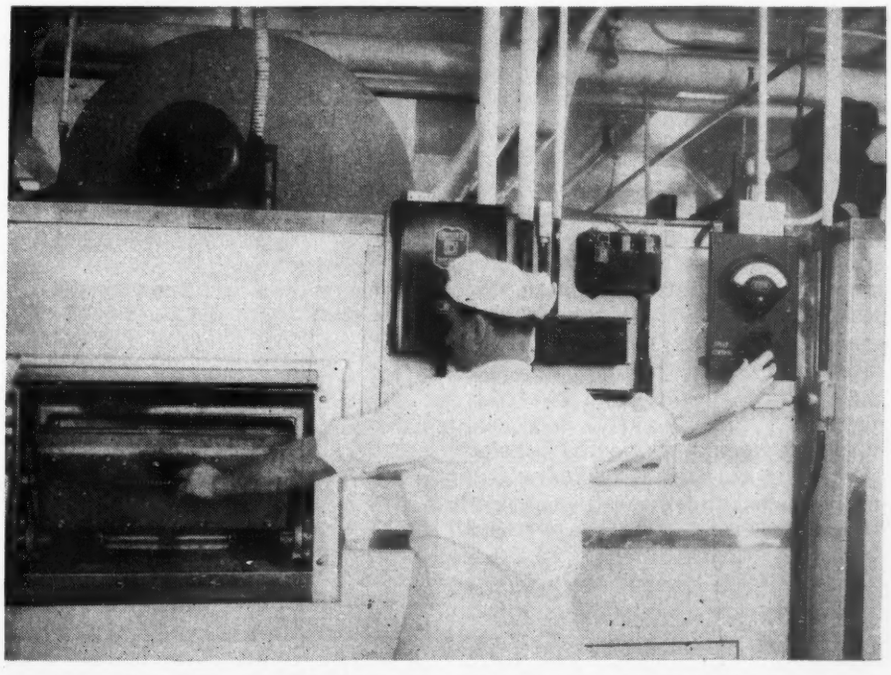
Handbook of Chemistry & Physics, Chemical Rubber Publishing Co.
Prescott & Johnson's *Qualitative Chemical Analysis*, McAlpine & Soule
Technical Methods of Analysis, Griffin
Food Analysis, Woodman
A.O.A.C. *Methods of Analysis*
Condensed Chemical Dictionary, Reinhold Publishing Co.
Outlines of Food Technology, von Loesecke
Food Technology, Prescott & Proctor
Vegetable Fats & Oils, Jamieson
Commercial Fruit & Vegetable Products, Cruess
Flavor, Crocker, McGraw-Hill Book Co.
Fanny Farmer Cook Book
Good Housekeeping Cook Book
Experimental Cookery, Lowe

Library Is Important

A good working library is also important as a laboratory tool. The writer has found the books listed in Table II to be helpful in bakery work. Again, there is no implication that the list is complete. For one thing, it does not include the very expensive reference texts that are too infrequently used in this type of laboratory to justify their purchase. Examination of books for the technical library before purchase is always a desirable procedure, for there is a fair amount of trash published in this field.

There will be times, too, when having a file of the current technical literature, such as the publications of the American Chemical Society, *Industrial & Engineering Chemistry*

(Turn to page 208)



The skilled baker has very little chance to do the work of the technologist since he is already overworked and harried by the pressure of meeting many production schedules.

New Agricultural Products Used in Candy*

Oil-seed, cereal and legume products, when incorporated into candies increased the fat, carbohydrate, mineral and vitamin content. Problems of color, particle size and incorporation of the ingredients are discussed and solutions given.

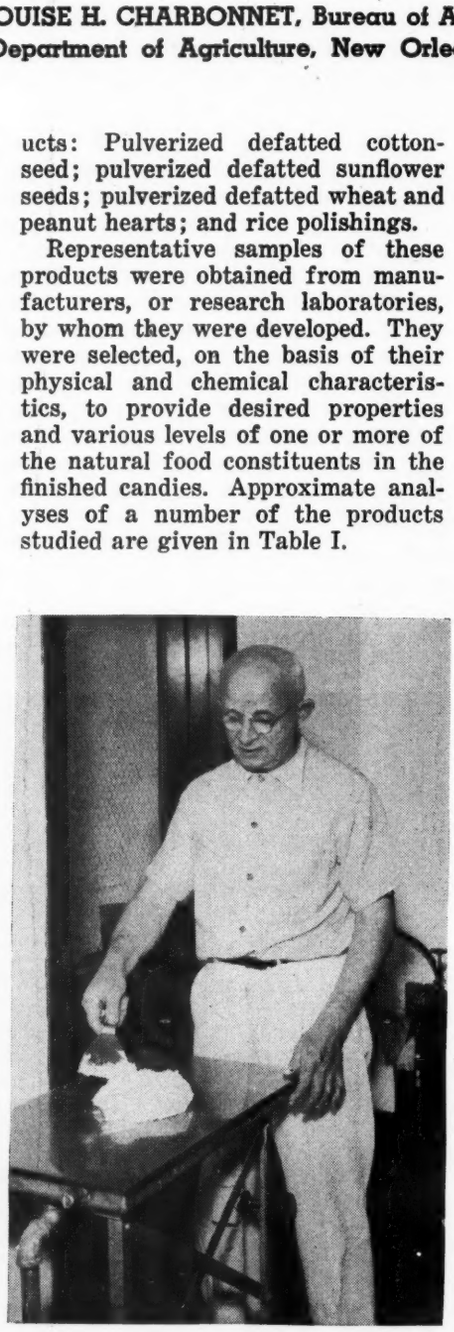
By H. H. HALL, F. J. FAHS** and LOUISE H. CHARBONNET, Bureau of Agricultural and Industrial Chemistry, U. S. Department of Agriculture, New Orleans, La.

DURING the past few years, new and modified products have been developed, which appear to offer possibilities of further extending the list of agricultural ingredients available for use in the manufacture of candy. Among these are products from peanuts, wheat, soybeans, cottonseed, sunflower seeds, rice, fruit, and fruit juice. Some of the products have resulted from the introduction or expansion of new agricultural crops, others from the perfection of new processing methods. The possibility of utilizing some of these products as candy ingredients is being studied cooperatively by the U. S. Department of Agriculture and the National Confectioners' Association. This paper reports some of the results of studies on the use of commercially available products as supplemental ingredients of some standard-type candies.

Ingredients

The ingredients that were given most attention in the cooperative studies were those derived from oilseed, cereal, and legume crops. This group of products was selected for earliest consideration because the possibility of their use as candy ingredients had not been extensively investigated and because, in processed form, they contain relatively high levels of one or more food constituents. Another factor bearing upon their use is that they are generally stable under most conditions of handling, and some are reported to have a stabilizing effect on other constituents of candy. Included in this group are the following products: Pulverized defatted cottonseed; pulverized defatted sunflower seeds; pulverized defatted wheat and peanut hearts; and rice polishings.

Representative samples of these products were obtained from manufacturers, or research laboratories, by whom they were developed. They were selected, on the basis of their physical and chemical characteristics, to provide desired properties and various levels of one or more of the natural food constituents in the finished candies. Approximate analyses of a number of the products studied are given in Table I.



Cream fondant to which cereal products have been added grains readily on the cooling table.

The products in this group, except rice polishings, are relatively rich in protein and contain varying amounts of carbohydrate, minerals, and the vitamins, thiamin, riboflavin, and niacin. Varying amounts of natural fat are also retained in some products, and those designated as defatted or partially defatted, have been defatted by mechanical pressing or by solvent-extraction methods. Because these products are insoluble in water, or other liquid components of candy, they are pulverized to the consistency of flour, and are practically impalpable to the tongue.

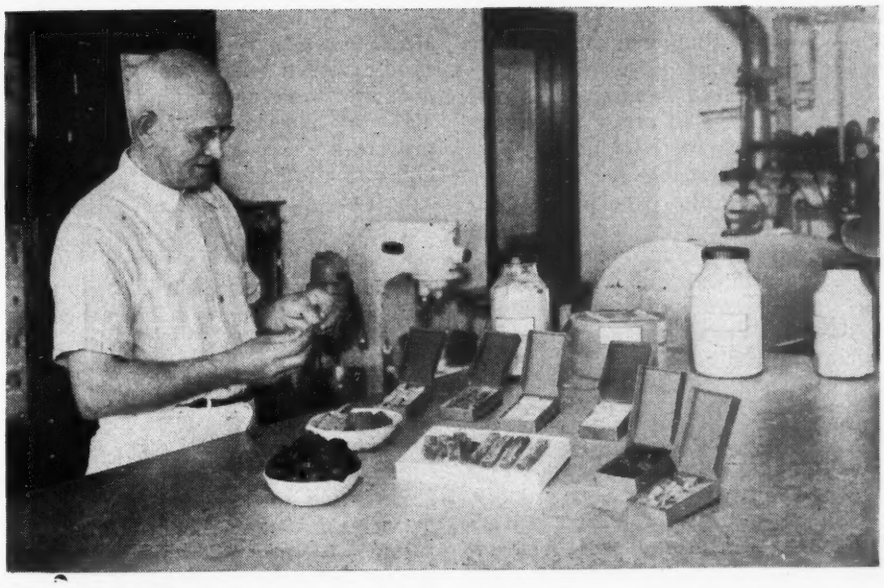
Experimental batches containing approximately five pounds each, of caramel, fudge, nougat, creams, jellies, fruit centers and hard candies were made in testing the feasibility of using the various ingredients. Different technics of incorporating the ingredients were tried in reaching desired levels of the principal food constituents (carbohydrate, protein, fat, and vitamins), in such a manner that the quality factors, color, flavor, and texture would not be adversely affected. Samples of different batches of candy were submitted to members of a taste-testing committee, which is comprised of representatives of the candy industry, for evaluation of quality and determination of the suitability of the ingredients. The chemical compositions of the candies were generally calculated from the analysis of the individual ingredients, and vitamins were determined by chemical assay methods, on fresh candies, and after storage periods of approximately 90 and 180 days.

During the course of this study, 20 series of experimental candies, each containing from 4 to 6 pieces were made and submitted to the

*Agricultural Chemical Research Division Contribution No. 175.
**Candymaker, National Confectioners, Association.

committee for evaluation of the quality factors, color, flavor, and texture. Each series was generally designed to determine the suitability of the use of an ingredient in different types of candy, or the maximum amount that it is possible to incorporate without adversely affecting its quality. When it was desired to determine only the suitability of an ingredient, varying amounts of it were incorporated into selected types of candy, which have flavor and color characteristics in keeping with those of the experimental ingredients. The resulting pieces were then judged for acceptability. Naturally, all the judges did not evaluate the quality factors alike and difficulty was frequently experienced in arriving at a composite opinion of the judges. A number of candies that contained experimental ingredients were judged to be of fair quality, indicating the possibility of modifying formulas, or improving some characteristic of the ingredient. Other candies, however, were judged to be of good-to-excellent quality, needing little or no further improvement. The candies included in the latter group, together with the ingredients used and the resulting composition of the pieces, are listed in Table II.

On the basis of the composite opinion of the taste-testing committee, oil-seed, cereal, and legume products are most acceptable in nougat, caramel, fudge, and coconut pieces, which contain ingredients with flavors that blend with, or mask those of the experimental ingredients. It is also indicated that the acceptable amount of ingredient is from four to seven percent by weight of the batch for mildly flavored products. There was less acceptance of this class of ingredients in creams and hard candies than in other classes. This was due largely to the effect of the ingredient on flavor and texture. The vitamins, thiamin and riboflavin, are natural constituents of the experimental ingredients and are also present in varying amounts in standard candy ingredients such as fruits, chocolate, nuts, and dairy products. The amounts in the experimental candies were calculated on the basis of a serving of 2 oz. of candy. The amount of thiamin in these candies varied from 2.5 to 9.3 percent of the daily requirements of an average adult; the amount of riboflavin is from 0.4 to 5.0 percent of the daily requirement. The results of storage studies showed that thiamin and riboflavin are very well retained for periods of 180 days or longer at temperatures of 74 to 80 deg. F. and a relative humidity of approximately 55 percent. Facilities were not available for assaying these candies for niacin.



Experimental candies made with products derived from oil-seed, cereal and legume crops.

Amount of Ingredients

In order to determine the maximum quantity of an experimental ingredient that can be incorporated into a particular type of candy, the series was comprised of a base piece, made from standard ingredients, and two or three pieces that contained different amounts of the test ingredients. All pieces were made as nearly alike as possible and, since the only variable in the pieces was the quantity of experimental ingredient added, it was readily possible to determine the amount that could be incorporated without adversely affecting the quality factors. Typical series of this type, containing pulverized defatted soya, in nougat and caramel pieces, are shown in Table III, together with approximate analyses of the candies.

The candies in this series judged to be of the best quality were the nougat and caramel pieces containing 4.0 and 4.6 percent, respectively, of defatted soya. The flavor of the test ingredient was not perceptible, and the texture was judged to be better than that of the base or other pieces. Addition of this ingredient to nougat, materially increased the amount of protein, thiamin and riboflavin in the pieces. Nougats containing this ingredient were shorter in texture and more tender than the base pieces. The amounts of protein and thiamin in caramels were likewise increased by the incorporation of this ingredient, but there was almost no effect on the texture of the pieces. The results of the assay for riboflavin in caramels indicated that substances were present that interfered with complete recovery of this vitamin from the modified candy.

Space limitation does not permit a detailed discussion of the results of experiments on the use of the various products as ingredients in all the candies included in the series. It is possible, however, to draw certain conclusions, and to make recommendations, that will be of value in future experimental work for the development of formulas in which these products are used. It is clear from the composite opinion of the judges, that the test ingredients were most acceptable in experimental nougats, caramels, and fudges. It is also indicated that the acceptable amount of ingredient is from four to seven percent by weight of the batch, for mildly flavored ingredients, and a lower amount for more strongly flavored ingredients.

Color Important

Most of the special ingredients tested so far have distinctive flavors and color. Although some were almost free of flavor, it was nevertheless necessary to use candy flavors that cover up, or blend well, with the flavor of the special ingredient. Final conclusions should not be drawn regarding the successful masking or blending of ingredient flavor, until several weeks after the candy has been made, since flavor reversions were noted when relatively large amounts of certain ingredients were used. It is recom-

mended that experimental lots of candy be stored under normal atmospheric conditions and, where possible, at elevated temperatures for at least 30 days in order to be certain that there will be no development of objectionable flavor.

The color of the experimental ingredients is of most concern when used in light nougats and creams. Difficulty was experienced in blending candy colors with those of the ingredient. When possible, only those special ingredients having little or no color should be used in light colored candies. Since the beginning of this study, manufacturers have made considerable progress in the elimination of color, and it is now possible to obtain practically white pulverized soya and wheat protein products. Additional improvement may be expected in the future in the color of other seed products as their use becomes more widespread and the demand for colorless seed products increases.

Some of the experimental ingredients tested were not ground finely enough at first, and they imparted a sensation of roughness when the candies were eaten. Most of these products are now ground to pass a 200- or 300-mesh screen and are practically free of roughness, especially in the chewy and grained-type candies.

Method of Incorporation

Because of the high protein content and water-insoluble nature of products derived from oil-seed, cereal, and legume products, difficulty was experienced in adding them to batches of candy while cooking or on the slab. The texture of the resulting candy was often adversely affected, due to balling of the added particles during cooking, and to their failure to become uniformly dispersed throughout the batch as cooking continued. Unless particular care was exercised to prevent overheating in batches containing lumped ingredients, scorching often occurred. Since it is necessary to thoroughly cook some of the experimental ingredients, such as soya and peanut products, in order to overcome the raw taste, it is essential that such ingredients be heated without balling or scorching. Moreover, it is possible to add larger quantities of insoluble ingredients to batches during cooking than it is by working them into the batch on the slab. Therefore, it seemed necessary that a method be developed for incorporating insoluble ingredients into batches while cooking, without the risk of balling or scorching. A technic was desired, whereby the addition of the dry-type ingredient could be more or less standardized for all types of candy, without radical modification of formulas or manufacturing practices.

The first experiments indicated that dry ingredients could not be added to batches during cooking without difficulty, and various methods of wetting with water were tried, as a means of obtaining better dispersion of particles. The addition of wet ingredients proved to be advantageous, but was not wholly satisfactory, as it necessitated the evaporation of unusually large quantities of water and prolonged heating of vitamin-containing ingredients. Dispersion of the ingredients in fat, before addition to the batch, was found to be satisfactory for caramel and other fat-containing candies, but this did not provide a standard technic for their addition to non-fat containing candies.

Since commercial sugar sirup is a constituent of many candies in which insoluble ingredients could be used it was selected as a dispersing medium for soya, wheat and peanut heart, peanut, and sunflower seed products. These ingredients were dispersed in cold sirup in varying amounts by moderate stirring, and allowed to stand at room temperature for 30 to 60 minutes before addition to the batch. There is sufficient moisture in the sirup to permit ready wetting of the ingredients and uniform distribution was obtained because there is no tendency of the particles to clump together. These ingredients were added to cast cream fondant, and to the bob during cooking, without balling or scorching of particles. Microscopical examination of the candies showed uniform distribution of the ingredient.

There is a possibility that the amount of cooking required to overcome the raw taste of certain ingredients, can be controlled by precooking the sirup-ingredient mixture prior to its addition to the batch.

(*Turn to page* 238)

TABLE I—Approximate Analyses* of Some Seed, Cereal and Legume Products

Product	Protein percent	Fat percent	Carbohydrate percent	Ash percent	Moisture percent	Vitamins: Thiamin mg./g.	Vitamins: Riboflavin mg./g.	Vitamins: Niacin mg./g.
Partially defatted cottonseed	57.53	6.45	21.39	6.24	6.34	10.4	10.2	85
Partially defatted peanuts	58.98	9.69	20.51	3.84	4.44	6.0	3.0	189
Wheat heart	39.00	0.85	46.15	5.00	7.0	33	8	69
Defatted soya	51.0-53.0	0.5-1.0	32.0-37.0	5.0-6.0	6.0-8.0	6-9	4	60
Defatted sunflower seeds	53.00	1.0	.....	.....	....	37	....	...
Rice polishings	11.00	11.94	56.96	7.66	10.67	25.92	34	396

*Analyses furnished by suppliers of these ingredients.

TABLE II—Approximate Analyses* of Candies Containing Oil-seed, Cereal, and Legume Products

Type of candy	Ingredients: Kind	Ingredients: percent	Protein percent	Fat percent	Carbohydrate percent	Vitamins: Thiamin mg./2 oz.	Vitamins: Riboflavin mg./2 oz.
Pink nougat	Wheat heart	7.6	3.9	7.7	80.7	0.15	0.05
Vanilla caramel	Defatted peanut	9.2	9.3	11.7	69.5	0.05	0.12
Cast creams, coconut flavor	Wheat heart	4.3	2.8	11.8	68.4	0.09	0.01
Fig-roll center, chocolate dipped	Defatted cottonseed	3.7	4.3	10.9	68.9	0.05	0.04
Chocolate fudge	Defatted cottonseed	6.2	7.2	9.4	72.9	0.05	0.11
Coconut fudge	Defatted soya	5.0	6.8	10.3	73.9	0.04	0.10
Coconut-fruit squares	Orange juice and defatted soya	7.0 4.2	4.4	14.7	....	0.05	0.01
Fudge	Defatted soya	5.6	5.2	9.8	....	0.05	0.05

*Approximate analyses based on composition of ingredients, except vitamins, which are determined by chemical assay methods.

TABLE III—Approximate Analyses of Nougats and Caramels Containing Increasing Amounts of Defatted Soya

Nougats	Defatted soya percent	Protein percent	Fat percent	Carbohydrate percent	Vitamins: Thiamin mg./2 oz.	Vitamins: Riboflavin mg./2 oz.
1	0	0.9	5.2	85.6	0.001	0.01
2	4.0	3.0	5.0	83.2	0.04	0.08
3	5.9	4.0	5.0	82.2	0.05	0.09
4	7.7	4.9	4.9	81.4	0.05	0.10
Caramels						
1	0	4.3	13.5	71.6	0.20	0.10
2	4.6	6.5	12.9	69.9	0.50	0.09
3	7.1	7.8	12.6	68.9	0.65	0.08
4	8.8	8.5	12.4	68.3	0.80	0.08

Potato harvesting.

Selecting and Storing Potatoes To Avoid Darkening*

Influence on finished product of reducing sugars in raw potatoes, how reducing sugars vary with storage conditions and variety, and what to do to reestablish equilibrium are all discussed in this article

THE reducing sugars in potatoes are almost entirely glucose (dextrose) and fructose (levulose). Analyses are usually expressed as glucose, and may be calculated as percent of the fresh weight or as percent of the dry weight. All results presented in this paper are calculated as percent of the dry weight. In the following discussion the term "low" is used for potatoes containing 0 to 3.0 percent, "medium" for those with 3.1 to 6.0 percent, and "high" if above 6.0 percent.

Potatoes high in reducing sugars are very susceptible to scorch. Potatoes with a medium sugar content are less sensitive to scorch but may give trouble at times. Those low in reducing sugars are not subject to scorch, except under very extreme conditions. Those prepared from potatoes very high in reducing sugars (above 7.5 percent of the dry weight) at specification moisture and unsulfited will become inedible after a few months at room temperature. Those prepared from potatoes containing reducing sugars to the extent of 7.4 to 5 percent of the dry weight will have a progressively longer storage life but will become unsatisfactory at room temperature in 6 to 18 months. Those from potatoes where reducing sugars comprised less than 5 percent of the total solids will be relatively stable at room temperature.

The behavior of dehydrated potatoes stored at 130 deg. F. is very revealing. Potatoes containing different amounts of reducing sugar were dehydrated to specification moisture content, then stored at 130 deg. F. Within a day or two those prepared from potatoes highest in sugar were dark brown in color. Those from potatoes lower in sugar were progressively of better color. Those from potatoes containing less than 3 percent on a dry weight basis were not seriously discolored at the end of 7 days, but at the end of 14 days all, but the very lowest, had begun to discolor (Fig. 1).

Sulfiting affords only a temporary protection against discoloration at higher temperatures. Hence, processors should attempt to process potatoes low in reducing sugar. The lower the sugar content, the better will be the product. The data in Fig. 1 indicate a break in the curve at about 3.0 percent, so potatoes containing reducing sugar up to and including that value are considered suitable for processing. Since some of the reducing sugars are leached out during processing, dehydrated potatoes prepared from raw tubers containing 3 percent reducing sugars will contain less than that amount. The available data indicate that, in general, dehydrated potatoes at specification moisture should contain not more than 2 percent reducing sugars.

Amount of sugars in potatoes: Within a given area, the two most

Potato chips, julienne or french-fried potatoes are affected similarly to dehydrated potatoes. To some extent this also applies to canned potatoes, potato salad, or canned foods containing potatoes—The Editors

*Abstracted from a joint report by The Quartermaster General's office and the University of Maine. A. Frank Ross, T. Hilborn, Lyle C. Jenness, and Emily M. Bartlett.

important factors influencing reducing sugars in fully mature potatoes are (1) variety and (2) storage temperature. The temperature at which potatoes are stored just prior to using is of particular importance. Maturity at time of digging may influence the reducing sugar content at that time. The behavior of potatoes grown in different areas may differ considerably. Therefore, each processor should determine from his state agricultural experiment station, or other similar agency, the relative behavior of the varieties grown locally in respect to reducing sugars. Within a given area, fertilizer treatment and other agricultural practices have only minor effects.

Seasonal factors may have some effects, especially in the comparative behavior of early medium, and late maturing varieties. It should constantly be kept in mind that generalities do not hold in all cases.

In Table I several different varieties are grouped into three classes, depending upon whether or not they tend to accumulate high, medium, or low levels of reducing sugar when stored below 45 deg. F. The data from which the table was constructed were obtained at the University of Maine and at Boyce-Thompson Institute for Plant Research, Yonkers, N. Y. It is emphasized that the classification here given may not be true for all areas, in fact, one exception is noted in the table. The table is intended merely as a guide.

The temperature at which potatoes are stored has a very great effect on reducing sugars. A temperature somewhere between 45 deg. F. and 50 deg. F. is critical for most varieties. Reducing sugar will accumulate below 45 deg. F. and will disappear at temperatures above 50 deg. F. In general, the lower the temperature, the greater will be the rate of accumulation as well as the total amount accumulated. Some exceptions to this rule have been reported. An illustration of the behavior of different varieties of potatoes when stored at various temperatures, is given in Table II.

It can be noted that at 70 deg. F., reducing sugars disappear, that at 50 deg. F., very little change occurs and that reducing sugars accumulate at 40 deg. F. and 36 deg. F. An important point to consider is the fact that approximately twice as much accumulates at 36 deg. F. as at 40 deg. F. Since potatoes will keep in good condition at the latter temperature there is no reason for allowing potatoes in storage to reach lower temperatures than 40 deg. F. Such potatoes will be far superior for dehydration to potatoes stored at lower temperatures.

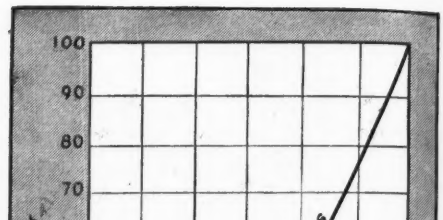


FIG. 1—Effect of reducing sugar content of raw tubers on the discoloration of dehydrated potatoes at 130 deg. F. The darkest sample was dark mahogany-brown in color and was given the arbitrary value of 100. Only those with a relative color of 10 or less were considered edible.

How to Handle Potatoes

The following suggestions are submitted as a guide in selecting lots low in reducing sugar. These are only generalities, and processors in some areas may find conditions different in their particular locality. If records are kept, however, on the reducing sugar content of the different varieties throughout the operating season, each processor can soon tell whether or not these suggestions fit his locality. If they do not, with his own data at hand, he can soon work out a scheme to fit his particular situation. In general, lots containing over 3.0 percent but less than 6.0 percent can be conditioned to a satisfactory level in 2 to 3 weeks at 70 deg. F. Those above 6.0 percent can be conditioned if necessary but should be rejected if possible. It is a much better practice to buy potatoes low in reducing sugars than to condition. The latter should be resorted to only if it is impossible to buy enough potatoes low in sugar.

The processor who stores his own potatoes is by far the best situated in respect to obtaining potatoes low in reducing sugars. It is strongly recommended that as soon as a contract is let, or as soon as he knows the amount to be used for the coming season, he should contract for sufficient storage space to carry him through the season, except possibly for the first three months. This stor-

TABLE I—Grouping of Varieties on Basis of Reducing Sugar Contents

High	Medium	Low
Green Mountain		Sebago
Bliss Triumph	Early Ohio	Russet Rural
	Katahdin	White Rural
Delaware	Early Ross	Rural New Yorker
Spaulding Rose	Irish Cobbler*	Irish Cobbler*
Warba		Chippewa
Russet Burbank		Sir Walter Raleigh

*Irish Cobbler was rated as medium in New York, and as low in Maine, emphasizing the need to obtain information about each variety in the different potato-producing areas.

TABLE II—The Amount of Reducing Sugar in Potatoes Stored at Different Temperatures

(Expressed as percent of the dry weight)*

Temperature	Days in storage	Green Mountain percent	Katahdin percent	Sebago percent
	0	3.8	1.4	1.3
70° F.	30	1.7	0.7	0.7
50° F.	50	3.9	1.5	1.3
	100	...	1.3	0.8
40° F.	50	7.3	4.0	4.0
	100	6.1	4.6	4.0
	150	6.3	5.7	3.4
36° F.	50	12.4	9.0	6.5
	100	9.4	9.4	7.8
	150	12.2	9.1	6.6

*Total solids' determinations were not made on all samples. The available data indicated an average total solids' content of about 20 percent for the Green Mountains and about 17 percent for the others.

TABLE III—Permanent Standards for Picric Acid Method for Determining Reducing Sugars

Standard number	Ferric chloride solution	Cobalt chloride solution	Dilute HCl	Distilled water
1.....	11 c.c.	2 c.c.	8 c.c.	To make 100 c.c.
2.....	11 c.c.	4 c.c.	8 c.c.	To make 100 c.c.
3.....	22 c.c.	9 c.c.	8 c.c.	To make 100 c.c.
4.....	27 c.c.	15 c.c.	8 c.c.	To make 100 c.c.
5.....	22 c.c.	22 c.c.	8 c.c.	To make 100 c.c.
6.....	16 c.c.	30 c.c.	8 c.c.	To make 100 c.c.
7.....	14 c.c.	40 c.c.	8 c.c.	To make 100 c.c.
8.....	12 c.c.	50 c.c.	8 c.c.	To make 100 c.c.

TABLE IV—Determination of Reducing Sugars in the Raw Potato by the Picric Acid Method

Evaluation of permanent standards listed in Table III (Juice diluted 1 to 4)

Total solids in the raw potato* (percent)	Reducing sugars in raw potatoes, expressed as percent of dry weight Standard numbers 1	2	3	4	5	6	7	8
16.....	1.3	2.6	3.9	5.3	6.5	8.5	10.5	12.5
18.....	1.1	2.3	3.4	4.6	5.7	7.4	9.1	10.8
20.....	1.0	2.0	3.0	4.0	5.0	6.5	8.0	9.5
22.....	0.9	1.8	2.7	3.5	4.4	5.8	7.1	8.4
24.....	0.8	1.6	2.4	3.2	4.0	5.1	6.3	7.5
26.....	0.7	1.4	2.1	2.8	3.6	4.6	5.7	6.8

*If total solids are not determined in every case, use the best approximation possible, taking into consideration the variety and the region in which the sample was produced.

age space should then be filled with varieties classified as low in respect to sugar or, as second choice, those classified as medium. Arrangements should be made to regulate the temperature in these storage houses or cellars according to the recommendations given below. In most sections it will not be necessary to provide in advance for the potatoes used within two or three months after digging. Most potatoes on the market during that period will be low in reducing sugars.

Effect of Aging

Potatoes just dug: All potatoes that are sound when dug, but for any reason are not expected to store well, should be used as soon as possible. This group should include any lots that are dug when the tops are green or any other lots where appreciable rot is anticipated. Immature lots should be tested for reducing sugars. Varieties subject to internal discolorations that develop in storage (but sound when dug) should also be used soon after digging. An example of this type is the Green Mountain variety, which is subject to net necrosis.

Peeled, trimmed potatoes ready for dicer.

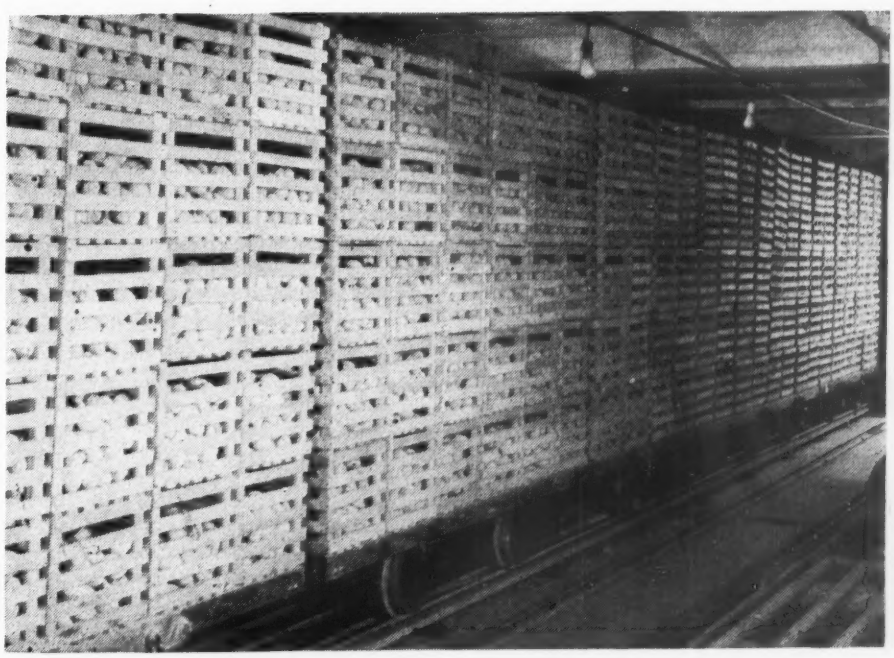
Three months after digging: Potatoes to be used during this period should be stored at 50 deg. F. and under no condition should the temperature be allowed to fall below 46 deg. F. Relative humidity is not so important provided either extreme is avoided. If varieties classed as high-reducing sugar producers are on hand, they should be used up during this period. The lots described in the preceding paragraph should be avoided, because, in general, rots and internal discolorations are much more severe at the warmer temperatures. Most varieties stored at 50 deg. F. will keep well for 3 months and some will keep longer. If more than a 3 months' supply is stored at 50 deg. F., they may, of course, be used until excessive sprouting occurs. If it becomes apparent that all cannot be used up before they sprout, the temperature should be dropped to around 45 deg. F. during the last part of the storage period. Low and medium sugar varieties stored at 50 deg. F. can safely be used without testing for reducing sugar, but it would be well to make routine checks on sugar content. High-sugar varieties should be tested, because a short conditioning period at warmer temperatures may be necessary in some cases.

Three to six months after digging: Low-sugar varieties should be used during this period. Those in the medium class may be used provided one can condition some lots before dehydrating. High-sugar varieties should be used only if one can condition all lots before processing. Potatoes intended for use during this period should be stored at a temperature between 40 and 45 deg. F. Under no condition should the temperature drop below 40 deg. F. Before these potatoes are used, they should be tested for reducing sugar. If they contain more than 3.0 percent, they should be conditioned at 70 deg. F. before use. Directions for determining reducing sugar and for conditioning are given in succeeding paragraphs.

In storage over 6 months: Use of potatoes of this age should be avoided if at all possible because of lower quality and increased cost. There will be greater shrinkage in storage, possible loss due to sprouting if the temperature rises much above 40 deg. F., higher trimming losses due to discoloration of eyes and development of disease, and there will be loss of texture (boiling tests for color and texture should be made). Potatoes held for use during this period should include only those varieties that are low in reducing sugar unless extensive facilities are available for conditioning. The storage house should be down to 40 deg. F. within two months after digging, and during subsequent months the temperature should be held as close to 40 deg. F. as possible. The temperature should not fall below 39 deg. F. and should not rise above 42 deg. F. Before they are processed, all lots should be analyzed for reducing sugar and those above 3.0 percent should be conditioned at 70 deg. F. before use.

Bought on the open market: This is the most unsatisfactory situation of all with respect to obtaining potatoes low in reducing sugars. Processors following this method should be prepared to condition at 70 deg. F. a fair-sized proportion of the potatoes processed. However, by following the suggestions given below, many lots can be obtained that are either satisfactory for dehydration or which can be conditioned to a de-

(Turn to Page 210)



Potatoes stored in crates on trucks.

Pack-Coding Avoids Grief

To obtain complete quality control, the c ode mark should be changed to indicate every change in the processing and in the quality or origin of the raw materials. Lot segregation applies equally to freezing, canning or other processing methods

By MAX MERGENTIME, Chief Chemist
Sunshine Packing Corp. of Pennsylvania, North East, Pa.

HIGH demand for food products during the war years and the shortages of machinery and labor have combined to lull many manufacturers into a careless disregard for quality. Quantity has been of such importance that frequently quality has been laid aside. This situation should not be allowed to continue. It is important for processors to turn their ingenuity to the problem of quality and how best to attain it and profit by it.

Many manufacturers of frozen, canned and processed foods know that quality control of their products begins with code mark segregation of their packs. They realize that without proper coding very little can be done effectively in the way of quality control. The inspection service of the U. S. Department of Agriculture has done much to prove the importance of this.

In order to make the best possible use of the code system it is important that the following requirements be adhered to:

1. When quality (variety, size, type or style) of raw product changes, the code should be changed. In this way, greater return to the packer is possible because the code provides a way for him to take advantage of price differentials for different quality levels.
2. The code should be changed when the process is altered. A change in process often results in a change in quality.
3. The code should be changed periodically to keep from packing too much under one code mark. If the quantity under each code is kept reasonably small, most trouble encountered later can be narrowed down to a relatively small quantity under only one or perhaps two codes.

The most common losses grow out of packing large blocks of uncoded merchandise of extremely variable quality instead of packing each grade under a different code.

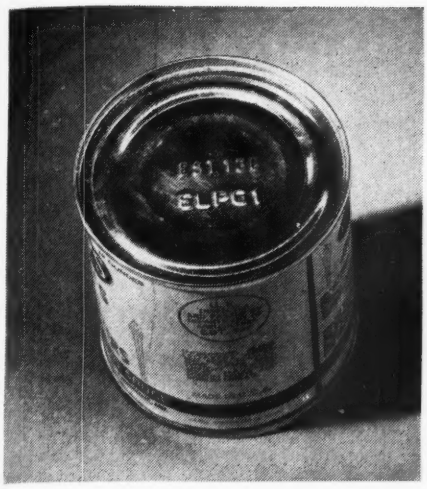
One manufacturer had 11,000 cases of 12 2½-lb. cartons of frozen peas, which the army wanted for Grade B or Extra Standard. This uncoded lot graded out 50 percent Grade B, 30 percent Grade C, and 20 percent Substandard because of thistles and small pods. No sale was made because the lot as a whole had to be classified as Substandard. It would have been simple to separate the three grades at time of packing so that proper advantage could have been taken of normal price differentials. As it was, the whole lot did not deserve more than bottom market price.

In another instance, a lot of 15,000 cases of 24 No. 2 cans of Early June peas had to be certified as off-grade. Although all cans bore the same code, the lot was a mixture of 20 percent Grade B, 60 percent Grade C, and 20 percent Below Standard because of high alcohol insoluble solids. No separation was possible. The Food and Drug law required that this lot, representing the canner's entire pea pack, would have to "wear crepe" if shipped interstate. This same canner offered almost his entire pack of 10,000 cases of No. 10 cans of green snap beans. This lot consisted of 20 percent Grade B, 55 percent Grade C, and 25 percent Substandard. All cans were coded alike. The lot as a whole had to be classified as Substandard and no sale was made because no separation was possible.

Many plants use the technic of "porch grading" the incoming raw product. It is classified into blocks according to estimated final grade. Each lot is then coded distinctly, processed separately, and warehoused accordingly. These blocks are graded in warehouses and, in the case of larger canners, again at main plant. These final gradings are used as the basis of sale and labeling.

It is a good idea to change code whenever the processing method is altered. In this way unforeseen bad results may be set aside or possibly improved product may be segregated.

Can coding frozen foods by stenciling.



Typical can cover, coded automatically during closing operation.

One packer of frozen apples was disturbed very much when inspection of his product showed that many of the apple slices when thawed out exhibited severe internal darkening. While only one-fifth of the containers had this failing, the entire lot of some 2,000 30-lb. tins had to be classified as Substandard. The tins were not coded and no separation was possible. This trouble was caused by insufficient penetration of the sulfite dip solution used. If sulfited apples are frozen too soon after dipping, sulfite penetration is not sufficient to prevent internal discoloration on thawing. This packer had varied part of his process (delay before freezing) without changing the code. Because of this, the bad portion detracted from the market value of the entire lot.

A cannery that was packing whole peeled white potatoes was having difficulty meeting the specifications. Since the potatoes were not very good, the line was running very slowly. This continued all through the morning and up until about midday. Upon arrival of the owner, the operation was immediately speeded up but the code was not changed. The afternoon's pack turned out poor. Since the code was not changed, the afternoon's pack was mixed in with the morning's pack in the warehouse. No separation being possible, the entire day's production failed to meet specifications and consequently was rejected.

Loss through failure to change code with a change in process is also exemplified by 3,000 cases of 12 46-oz. cans of orange juice, of which approximately two-thirds of the cans were enamel lined. Most of the enamel had flaked off to remain suspended in the juice, rendering it unfit for human consumption. The other one-third consisted of plain cans containing juice in good condition. It was regrettable that there were no distinguishing marks to permit a separation.

To look on the bright side for a moment, one freezing company of my knowledge used to change codes when the process varied. Whenever peas for freezing, for instance, had been insufficiently scalded they were code marked distinctly, held separately, and sold as early as possible. Frozen peas improperly scalded develop off-flavors during prolonged freezing storage, but are perfectly good if used within the first four or five weeks after packing.

Changing Code Periodically

A periodic change in code, based on an arbitrarily chosen period of time or number of cases packed, is always a good safeguard against un-

Can coding processed juice by stenciling.

foreseen troubles. It also automatically breaks the pack up into conveniently sized lots, which can be logically tied in with the regular quality control routine, such as notes on quality, weight checking and mold counting.

Even in plants where quality control systems are not in effect, it has frequently been found that merely changing the code daily is a valuable expedient. This enables the processor to segregate his pack in a general way and to tie in the daily code marks of the lots with his own daily notes on quality.

Examples of losses because of failure to change code frequently are also common. An inspection involving some 5,000 50-lb. uncoded cans of frozen r.s.p. cherries, representing one producer's entire cherry pack, was offered to the government. About half of the cans contained excessive pits. Since no segregation by code was possible, the whole lot had to be certified as off-grade. It is most probable that pitting was not faulty all through the season. Simple codes, changed daily, probably would have permitted segregation of a substantial quantity of pit-free cherries. No sale was made. Several weeks later, another company in the same region submitted some uncoded 2-lb. jars of cherry jam. They contained excessive broken pits. Again there was no sale.

Periodic changing of code is a very good protection against Food and Drug Administration seizures of large blocks of merchandise. Proper coding generally enables F&DA inspectors to spot the trouble in one or two coded sections, representing substantially less than the entire block of goods in question.

In a canner's warehouse, F&DA inspectors were concerned about a block of some 5,000 cases of 24 No. 2 cans of Early June peas. The canner had broken his pack down properly by coding and was able to show that the major portion of the lot was not objectionable.

Coding of Berries and Jams

All concerns packing frozen and canned, uncultivated berries and fruits, such as huckleberries, blackberries, elderberries and guava, should code properly. Uncultivated fruit, too frequently, has a high mold

(*Turn to page* 234)

Perforated code on label.

Ice Bank Reduces Refrigeration Peak Load in Milk Plants

When chilled sweet water is used for cooling, refrigeration can be stored at night in an ice bank. This permits the use of smaller compressors than direct expansion cooling requires. The system offers insurance against breakdown and power failure

By CLYDE H. MINSTER, Dairy Production Engineer
Caro-Maid Ice Cream Co., Dillon, S. C.

THREE different types of refrigeration mediums are available for the cooling of food products. They are brine, direct expansion of the refrigerant, and chilled sweet water.* Before a decision can be made as to which medium or mediums to use, many factors must be taken into consideration. When direct expansion is used, special controls, special piping, and controlled conditions are required at each point of application. Brine and chilled sweet water require such special installations at only one point—the point where they are cooled. From that point they can be piped to all types of processing and cooling equipment where a moderate degree of cooling is needed.

Chilled sweet water is less corrosive than brine, and is adaptable to a much greater variety of applications. Likewise, it is much more flexible than a direct expansion cooling system. For this reason many food processing industries are using chilled sweet water when cooling their products in vats or by means of surface coolers.

The almost unlimited flexibility of application is the quality that gave the use of sweet water its original impetus. Good operation requires using any system that presents definite possibilities of improving and controlling the product. Good operation also requires operating at a minimum cost. As with most things, there are disadvantages to the use of sweet water. One of the most important is that, while it is very flexible as to where it can be applied, it is also very rigid as to its refrigeration requirements.

*The term sweet water is used to distinguish ordinary water from brine. Chilled sweet water is cold water as near the freezing point as practicable.

Where the heat is removed from the water by mechanical refrigeration at the same rate heat is added to the water in the various heat exchangers, the refrigeration load is just as concentrated and the peak of such load is just as severe, or slightly more so, as with the use of direct expansion. Thus, if a heavy cooling job exists for just a few hours each day, the refrigerant compressing equipment must be large enough to handle this peak as it occurs even though considerable equipment afterwards remains idle until the next day.

This condition is a result of the fact that water, as water, can be cooled only to its freezing point, which is 32 deg. F. Actually, water at 34 deg. F. at the heat exchanger is considered very good. Since most products to be cooled are better protected if cooled under 40 deg. F., it is obvious that there is little possibility of storing refrigeration in water.

Using Water or Brine

When cooling with brine, the brine can be strengthened so that its freezing point is extremely low. By cooling it far below the required temperature at off-peak periods, refrigeration can be stored in the brine. This permits some distribution of the actual refrigeration requirements and allows a reduction in peak load. This, however, has two decided disadvantages. In the first place, a large volume of brine is required if any appreciable amount of refrigeration is to be stored. In the second place, refrigerating the brine to low temperatures is costly in that, the lower the temperature, the greater the power requirement per ton of refrigeration.

Recognizing these disadvantages, a system has evolved that has all the advantages of sweet water and permits a far more economical hold-over of refrigeration than the brine system. This is known generally as the "Ice Bank Hold-Over System of Refrigeration Storage." Basically, it comprises a series of refrigerated coils or plates submerged in water. These are cooled at night when the refrigeration load is at a minimum, and sufficient ice is frozen on them to supply all the refrigeration required for the next day.

When actual cooling of the food products is begun, the unfrozen water is constantly circulated over these "ice banks." This circulation must be arranged so that the water travels over sufficient ice surface to keep it at, or very near to, 32 deg. F.

The great advantage of this system results from the use of the "latent heat of fusion" of ice. The following discussion is given for those unfamiliar with the latent heat phenomenon. Assuming that any substance is made up of many molecules, each of which possesses all of the qualities exhibited by the substance as a whole, the following conclusions are reasonable:

1. The molecules of a solid (such as ice) are less active than those of a liquid (such as water).
2. The molecules of a liquid (such as water) are less active than those of a vapor (such as steam).
3. The activity of the molecules in a given substance is in direct proportion to the quantity of heat the substance contains. The more heat that is added, the greater will be the activity of the molecules. The more heat removed, the less will be the activity.

Take ice as a starting point. Ice will melt into water at 32 deg. F. if heat is applied. If the ice is at 32 deg. F., however, when heat is applied, a certain quantity of heat is

required to increase the activity of the molecules to a point where a liquid is formed. Until sufficient heat is added to complete the change from a solid to a liquid, no rise in temperature will take place. The heat required to increase the activity of the molecules in a solid to a point where it becomes a liquid without an increase in temperature is the latent heat of fusion. Conversely, if we wish to freeze water into ice, the activity of the molecules must be slowed down to a point where the water exhibits the quality of a solid. We must remove the latent heat of fusion to do this.

For any substance under standard conditions, the latent heat of fusion is a constant. For water it is 144 B.t.u. per lb. Thus every pound of ice we freeze is capable of absorbing 144 B.t.u. of heat when used to cool another substance, and the temperature of the melted ice still will be 32 deg. F. If we cool 1 lb. of water to just 32 deg. F., it will not absorb any heat without an accompanying rise in temperature. If only 8 B.t.u. are added, the temperature of the water will rise to 40 deg. F. By changing the state from water to ice, the storage of refrigeration has been increased many times. The net result is that a real storage of refrigeration is possible in a minimum of space.

Direct Expansion vs Ice Bank

A comparison of requirements for direct expansion cooling and ice bank storage of refrigeration will give a more specific picture of comparative compressor requirements.

Assume that a milk plant is cooling 5,000 gal. of milk from 85 deg. F. to 38 deg. F., using artificial refrigeration. The rate of cooling is 1,000 gal. per hr. If direct expansion is used, the compressor must be large enough to remove all the heat at the time the milk is being cooled. The hourly load becomes:

$1{,}000 \times 8.6$ (lb. per gal.) $= 8{,}600$ lb. per hr., $8{,}600 \times .93$ (sp. heat of milk) $= 7{,}998$ B.t.u. that must be removed each hour for each deg. F. the temperature of the 8,600 lb. is reduced. From 85 deg. to 38 deg. is a temperature reduction of 47 deg. Therefore:

$7{,}998 \times 47 = 375{,}906$ B.t.u. that must be removed each hour.

There are 12,000 B.t.u. in 1 T./hr. of refrigeration.

Hence: $\dfrac{375{,}906}{12{,}000} = 31.3$ T./hr. of refrigeration required.

TABLE I

Pipe Required to Provide 100 lb. of Ice

(Ice 1 in. Thick on the Pipe)

Size of Pipe—in.	Length of Pipe—ft.
1	35
1¼	30.2
1½	28.

To handle this load a 7x7 in., vertical, 2 cylinder ammonia compressor operating at 357 rpm., 40 lb. suction pressure, and 185 lb. discharge pressure, would be needed. Brake hp. requirements would be 31.4. This requirement per hr. would cover a 5 hour period and the equipment would presumedly be idle the other 19 hours.

Now if the total cooling load were calculated and sufficient ice stored to take care of the entire load, the situation would be:

Assume that the ice is frozen on the coils during a 14 hour off-peak period. The total load will be:

$5{,}000 \times 8.6 \times 93 \times 47 = 1{,}879{,}530$ B.t.u.

Distributing this load over 14 hours gives a peak hourly load of

$\dfrac{1{,}879{,}530}{14} = 134{,}252$ B.t.u. per hr.

Transposing this to T/hr. of refrigeration:

$\dfrac{134{,}252}{12{,}000} = 11.1$ T/hr. required.

This load can be handled with a 5x5 in. ammonia compressor operating at 327 rpm., 30 lb. suction pressure and 185 lb. discharge pressure. B.hp. requirements would be 14.7.

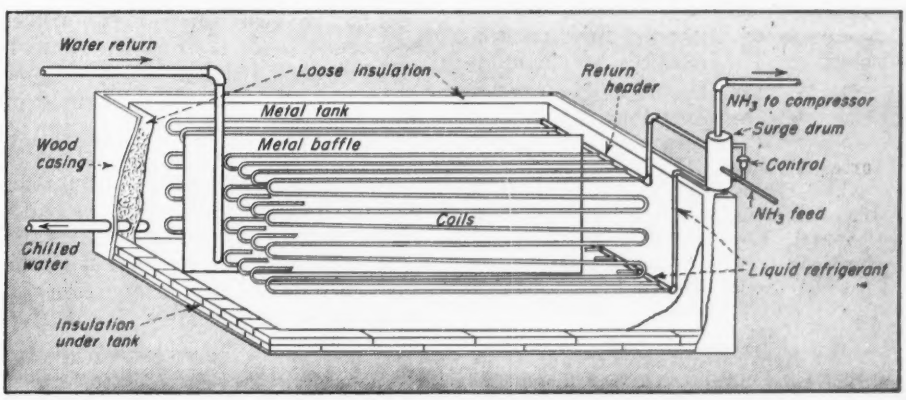
Calculating the Coils

Several methods can be used for estimating the size of the ice freezing system needed. A safe method for calculating the number of feet of coils required is based on the freezing of a layer of ice 1 in. thick on the outside of the coils. Calculate the total daily refrigeration load that is to be taken care of with chilled sweet water. Divide this figure (which will be in B.t.u.) by 144. The result is the pounds of ice that must be frozen on the coils to store sufficient refrigeration for one day's operations. It is desirable to add 10 percent to the above figure as a factor of safety. In Table I are given data on the lengths of different sizes of pipe required to provide 100 lb. of ice. From this table it is easy to determine the number of feet of pipe needed to store the required amount of refrigeration.

Design of Ice Bank

Commercial ice bank hold-over systems that are very efficient are available. It is possible, however, to construct your own system. If the system is to perform properly, the following fundamental requirements should be observed.

1. Have sufficient pipe to permit adequate accumulation of ice.
2. Arrange the pipe so that there will always be space for water circulation between the pipes. Contact of the water with a large surface of ice is necessary for adequate cooling.
3. Preferably use a flooded refrigeration system, controlling the liquid level with a float valve or float switch.
4. Insulate around the tank that will hold the coils and water with at least the equivalent of 4 in. of corkboard.
5. Provide positive means of agitating the water while using it for cooling.
6. Circulate large volumes of water through the heat exchangers to prevent excessive rise in water temperature.
7. Recirculate the cooling water over the ice bank in order to prevent possible loss of refrigeration.



Design of freezing tank for ice bank system for chilled sweet water, showing location of coils and hookup for flooded system of refrigerating them. Water outlet and return, and methods of insulating the tank are shown. The baffle in the center of the tank forces the water to flow over the entire bank of coils before it is pumped to heat exchangers.

Meat Packing and Processing In Wartime Germany*

U. S. Army investigators found that the German meat industry had kept sanitation standards high, in spite of difficulties. Sausage, fresh or canned, made up half the meat diet of the troops and of the civilians

By GEORGE T. CARLIN, Chicago, Ill.

IN late 1944, when it became apparent that much of the German industrial area would soon fall into the hands of the victorious Allied armies, various committees of civilians were organized to study German activities in their specialized fields. Many of these committees were made up of technical men and their scope covered the entire industrial development of Germany.

The food investigating committee was organized directly by the United States Army at the request of the Quartermaster General. As Commandant of Q. M. C. Research and Development Laboratory, Chicago, Ill., Col. Rohland A. Isker was given the responsibility of procuring and briefing the personnel selected for this mission. There were several other food committees, but ours was the only one working under direct supervision of the U. S. Army. We were known as the C. I. O. S. (Combined Intelligence Objectives Subcommittee), Food Intelligence Mission.

Shortly before V-E Day, the final members of the food mission were selected. The mission consisted of:

R. W. Pilcher, Research Division, American Can Co., Maywood, Ill.

Walter F. Straub, Straub Laboratories, Chicago, Ill.

C. G. Harrel, Pillsbury Flour Mills, Inc., Minneapolis, Minn.

W. B. Essellen, Jr., Massachusetts State College, Amherst, Mass.

G. T. Carlin, Swift & Co., Chicago, Ill.

Army Representatives

Members of the committee traveled as representatives and members of the U. S. Army and, as such, had no official connection with private American business. We lived in army camps, traveled under army orders, ate army food, used army vehicles, and reported to army personnel. Lt. Col. David B. Dill was our superior officer in Europe. He was chief of the Intelligence branch of the Procurement division at Frankfurt, Germany. In civilian life, Colonel Dill is connected with Harvard University.

George T. Carlin, the author, was a member of the Combined Intelligence Objectives Subcommittee of the Food Intelligence Mission. This group investigated food processing operations in Germany as Army representatives.

The group was separated at Frankfurt into teams and each team was assigned to its specialty. I was given meat packing and meat canning, fats and oils, dairy products and also requested to assist on bakery problems and on certain aspects of dehydration.**

An American jeep was assigned each team together with a driver and the tour was started that carried us to many parts of Germany, to Czechoslovakia and into some sections of Holland. I shall try to point out some of the more interesting observations in connection with German food processing.

Slaughtering Operations

Probably no worse time could have been chosen to judge the operations of the German meat industry and the quality of its products than the period when we saw it. Germany was without livestock fit for slaughtering purposes and was particularly short of hogs, chickens and beef cattle. About the only slaughtering operations encountered consisted of the dressing of cows, field oxen, some horses and only a sprinkling of hogs and beef cattle. The shortage of fodder during the last year of the war led to the slaughter of all grain-consuming livestock. This slaughter included much of the breeding stock as well as the small, under-developed pigs and calves. The meat surplus was canned for army use. Some of this canned product exists in Germany today. The small 5- to 10-lb. pig was chopped up and canned, bones and all, with a resulting almost tasteless, somewhat gelatinous product.

The normal German livestock slaughter is approximately 9,000,000,000 lb. per year, with two-thirds of this weight made up of pork. Available stock, plus the slaughtering operations for the year 1944, produced 5,000,000,000 lb. of meat

*Based on a talk given before the Chicago Section of the Institute of Food Technologists.

**Food Industries will present in a later issue the author's observations on these other branches of the German food industries.

products, a shrinkage of about 44 percent. Of this quantity, one-third went to the army and the remaining two-thirds were rationed among the civilian population. No figures were available for 1945 production but it is estimated that 1945 slaughter was not more than 10 percent of normal. Prospects for increased slaughter even in 1946 looked gloomy indeed. The zones occupied by American, British and French troops simply do not produce sufficient grain for both people and livestock. Unless means are found to alleviate the situation, the West Prussian provinces and Bavaria unlikely will be productive of meat animals for a long time to come.

Sanitation Standards High

German slaughter-house facilities were good, even when judged by American standards. Sanitation and clean-up methods were highly developed and all plants were splendid examples of what can be accomplished by good housekeeping methods. Shortages of soaps, chlorine compounds, and the like must have handicapped the Germans severely in their clean-up measures. Their plants, however, did not give evidence of neglect. Aluminum, chrome steel, stainless steel and other non-rusting alloys were used liberally. White tile and glazed bricks were the rule rather than the exception. Waste recovery was usually handled on an efficient scale. Green bones were speedily rendered with resulting bone fat used for edible purposes. Most of the bone fat found its way into liver sausage. The rendered bones were then extracted with trichlor-ethylene and the fat-free bones were crushed for use in animal feed.

There were no large packing organizations in Germany judged by American standards. The largest firm was the Efha Company of Berlin and the second largest, either Ahrberg of Hanover or Sauerman of Kulmbach. Efha was equipped to handle approximately 3,500 hogs per week and the latter two packing plants approximately 2,500 hogs per week each.

There were no multiple-unit packing plants in Germany. Each firm sold its products within a relatively short radius of its plant. There was little cross shipment of product over the country.

Allocation Purchase Plan

The large cities of Germany had municipally operated slaughter houses. Such plants were under the supervision of the city government and slaughtered animals for individual butchers. Animals were purchased under an allocation or quota system established by the butchers' guild and the meat slaughtered for each individual butcher was kept in a separate storage locker in slaughter house cooler. Under this system, the individual butcher had little or no choice concerning the quality of product allocated to him. This system was instituted in 1933 and it was stated that the quality of livestock had steadily declined since that date. There were more than 100,000 individual butcher shops in Germany. Nearly all of these shops were engaged in sausage production and ham and bacon curing and smoking prior to the war. Nearly all operated by rule-of-thumb methods handed down from father to son throughout several generations. A possible tribute to the skill of these local butchers and to the integrity of their operations might be deduced from the fact that approximately 40 to 45 percent of the total German meat supply is consumed in the form of one type of sausage or another. The German meat industry was dominated by craftsmen, not by food technologists.

Ham Curing—The German meat industry used both dry-curing and arterial pumping methods. The arterial pumping method was by far the more common. A combination arterial pumping and dry-cure method was also used. The curing agents were carefully controlled by German government authorities. Only sodium nitrate, sodium nitrite and sodium chloride were used for preservative purposes. Sugar was included in the curing pickle for both ham and bacon. The so-called "durable" hams packed for the German army were cured either by arterial pumping or by dry-curing methods with the top limit of 6 to 7 percent on the salt content. Attempts were made to have the finished ham as dry as possible. Smoking required 20 to 40 days. Smoke-house temperature was maintained at approximately 70 to 75 deg. F. during the entire smoking period. Hams prepared in such manner were guaranteed for a minimum of six months' storage without refrigeration, providing they were packaged in a manner which would protect them from insects.

Principal differences between American and German hams were:

1. The fat of German pork is firmer than American. This is brought about by the use of small grains rather than corn for feeding purposes.

2. The moisture content of German hams is usually lower than that of American. The maximum weight gain due to pumping was found to be

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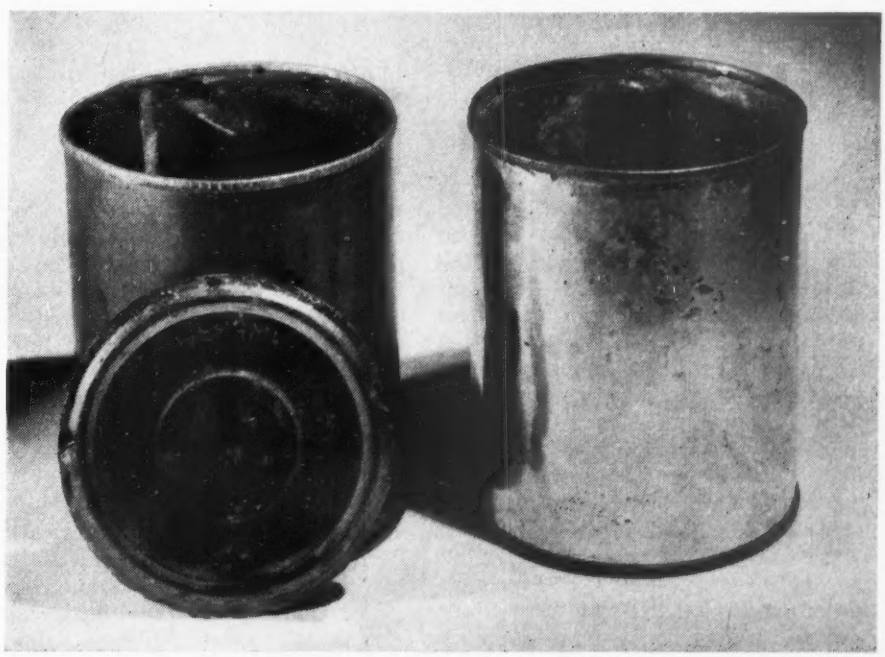

These are German army 1-kilo cans for processed meat. The embossed "WEHRM" identification shows on one of the covers. "The Weissblech" can (right) was used in the early war years when "white metal" was available. Later on, "Schwarzblech" (left) was used for cans, which were expected to keep meat in good condition for about four months. Actually the meat kept longer, and cans are still found for sale. The meat was "Wurst" or "Schmalsfleisch," the latter being canned whole hog, popular despite its high lard content. No labels were used on these cans. The cans shown here were sent from Germany in June by McGraw-Hill World News representatives.

In preparation for palletizing, cases are automatically glued and sealed. Cardboard sleeves are applied to cases, which are then wire-strapped as an additional protection.

Palletized Food Shipments

Shipment of canned citrus juices for the armed forces was speeded up and simplified by palletizing the cases with glue. Pallet exchange pools, lightweight metal and expendable pallets will pave the way for pallet handling of civilian commodities

By BRUCE W. SKINNER, Vice-President and General Manager
Citrus Concentrates, Inc., Dunedin, Fla.

WARTIME experience of the U. S. Army and Navy showed the speed and convenience of the fork truck-pallet system for handling and shipping large quantities of material. Palletizing expedited shipments from manufacturing plants to supply depots, ships, foreign supply dumps and disbursing points. Navy handling experts estimated savings of 479 man-hours in moving a shipment of 100 tons by unitizing the material on pallets. It was found that approximately 4,080 separate units could be accommodated on 77 pallets.

Palletizing has important applications in the handling of civilian commodities, especially processed foods. The largest potential shipper of palletized material is the canned food industry.

During the war, Citrus Concentrates, Inc., Dunedin, Fla., employed the fork truck-pallet system of handling canned citrus juices. This company was one of the first in the food industry to use this method. Canned citrus juices were prepared for shipment to the armed forces by unitizing the containers on wooden pallets. Metal shortages necessitated the use of glue in place of steel strapping.

Unitizing With Glue

The unitizing operation is shown in the accompanying pictures. Six No. 10 cans of citrus juices were loaded into cases moving along a conveyor. The case was glued, closed and sealed automatically as it moved down the line. A sleeve was slipped over each case, for reinforcement of the joints. This sleeve was an extra thickness of case material in the form of a box with both ends open. Next, each case was wire strapped.

At the end of the conveyor line, a set of rollers applied two parallel bands of glue to the bottom of the case. These rollers, friction driven and about 1½ in. wide, revolved in a shallow glue pan. Special glue, supplied by the National Adhesives division of National Starch Products, Inc., was used. The glue had a high shear strength that prevented endwise and sidewise shifting of the units. Its low tensile strength permitted easy separation of the cases upon unloading. A single upward blow is sufficient.

After application of glue, each case was lifted by hand and placed on pallets. Pallets were loaded in alternate layers according to the "row pattern" method. A finished pallet had a gross weight of approximately 2,700 lb. or 3,200 lb., depending upon whether it was five or six layers high. Pallets were picked up and carried

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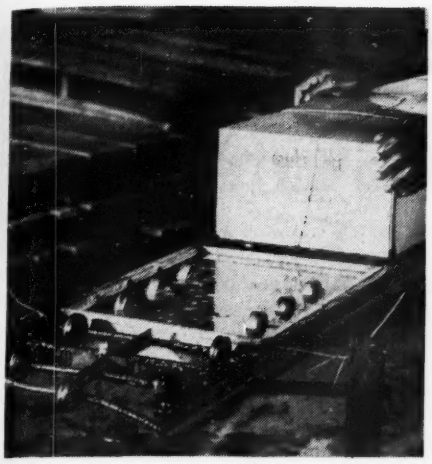


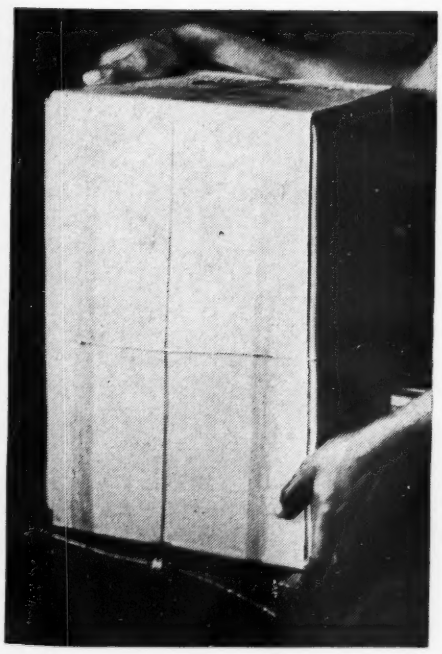
(Above): Cases are carried by conveyor over glue applicator where three pairs of rollers apply two parallel bands of glue to the bottom of the cases.

(Upper right): Glued cases are loaded on wooden pallets in accordance with the "row pattern" method. Pallets are loaded in conformance with government specifications.

(Center right): Case removed from pallet by a sharp upward stroke of the hands shows minor damage to the case and indicates the strength of the glue.

(Lower right): Fork-lift trucks loading palletized canned citrus juices into cars for shipment. Palletized loads are carried either from warehouse or conveyor line.

(Below): Bottom view of case showing how parallel bands of glue were applied by rollers. Bands of glue are placed 2½ in. from edges of cases.



Mississippi Attracts Industry and Aids State

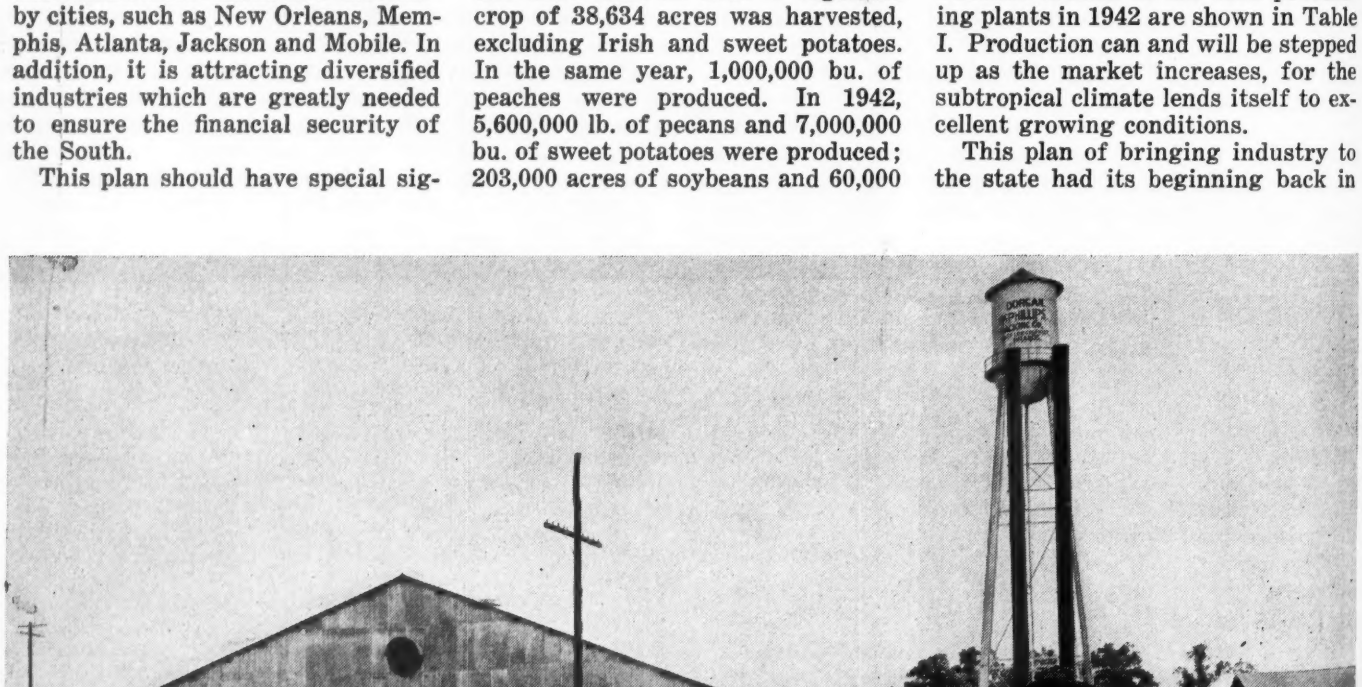
By building plants, furnishing capital, labor and raw materials, Mississippi is bringing prosperity to its communities. Food industries might well find an excellent opportunity in this state's program of "Balancing Agriculture with Industry"

By DAVID MARKSTEIN

TO bring back prosperity to the communities of Mississippi, the state, in 1944, revived a program that was first inaugurated in 1936 but dropped in 1940. Fourteen industries moved into the state under this plan prior to 1940. Since the plan has been revived another 21 have begun operations, bringing the total to 35 plants. It is successfully restoring many communities to economic stability and bringing employment to the inhabitants of those communities who have been forced into the flooded labor markets of the nearby cities, such as New Orleans, Memphis, Atlanta, Jackson and Mobile. In addition, it is attracting diversified industries which are greatly needed to ensure the financial security of the South.

This plan should have special significance to those in the food industry as the Magnolia state's greatest single resource is its soil. Two-thirds of the population are directly dependent upon it. Of the total land area of 30,348,800 acres, approximately 19,157,000 acres are used for farming. Crops grown extensively are sweet potatoes, corn, rice, wheat, oats, sugar cane, peanuts, pecans and various types of fruit. Though latest figures are not available, the following is an indication of the agricultural resources of the state. Statistics show that in 1939 a vegetable crop of 38,634 acres was harvested, excluding Irish and sweet potatoes. In the same year, 1,000,000 bu. of peaches were produced. In 1942, 5,600,000 lb. of pecans and 7,000,000 bu. of sweet potatoes were produced; 203,000 acres of soybeans and 60,000 acres of peanuts were under cultivation. Figures for the same year show the estimated value of chicks and eggs sold totaled $12,867,000 and milk production was estimated at 1,359,000,000 lb. In 1942 there were eight food processing plants, one pickle factory and one starch plant in operation. An average of 4,000 to 5,000 acres of cucumbers are harvested each year for the pickle factory. At the sweet potato starch plant approximately 2,750 tons of sweet potatoes are used annually. Produce canned at the food processing plants in 1942 are shown in Table I. Production can and will be stepped up as the market increases, for the subtropical climate lends itself to excellent growing conditions.

This plan of bringing industry to the state had its beginning back in



Dorgan Packing Company plant in Columbia, Mississippi. This company was the first to take advantage of the BAWI plan in 1936 and today employs about 300 people from the community.

TABLE I—Tonnage of Various Products by 8 Canning Plants in 1942[1]

String beans	2,766
Sweet potatoes	3,550
Peppers (Pimento)	436
Spinach	1,416
Turnips and mustard greens	613
Crowder peas	550
Beets	307
Okra	251
Pole beans	310
Tomatoes	2,091

[1] "Commercial Agriculture Production and Marketing Methods and Facilities in Mississippi." D. Gray Miley. p. 82, Table I, Bulletin No. 394, October, 1943.

1936 at Columbia, Miss. Hugh L. White, operator of a lumber mill, realized that the town was decaying economically. Calling together his business friends, he sought to find an answer to the situation. As a result, the "Balance Agriculture with Industry" program was born. The Dorgan Packing Company was the first industry to cooperate with the group and today this plant employs approximately 300 Columbians.

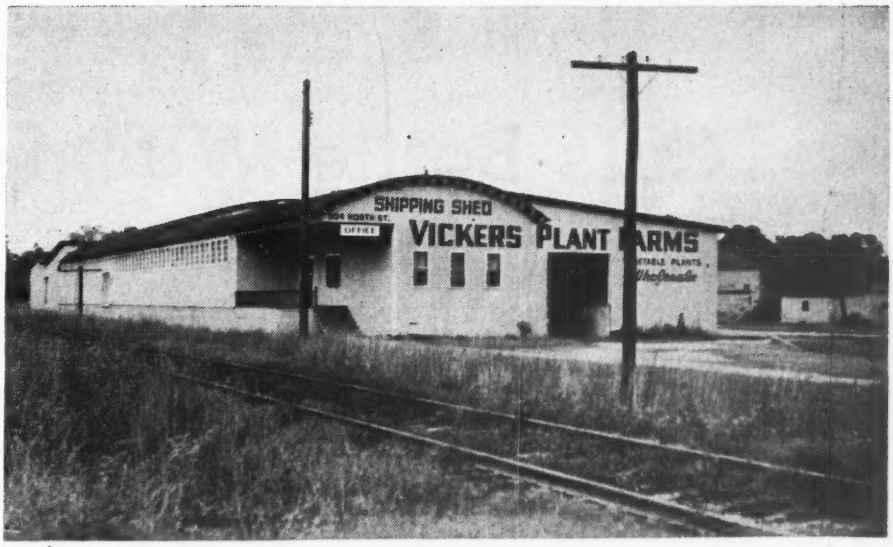
When Hugh L. White became governor of Mississippi, he installed the plan on a statewide basis. Fourteen thriving plants were brought into the state. In 1940, the plan was killed by White's successor. In 1944, however, when Thomas L. Bailey became governor, the BAWI was revived, creating the present agricultural and industrial board, a nonpolitical body, to supervise its operation.

The present BAWI is, in effect, an industry-subsidy, but it differs from most industry-attraction plans in that the industries brought to the state pay back, in the end, any financial assistance rendered to them.

How the Plan Works

Under the 1944 law,[1] passed by the state legislature, Mississippi's small towns are empowered to negotiate with the manufacturer-prospects on the basis of offering the manufacturer an already-built plant to operate. The manufacturer invests no capital of his own and pays his way out of his Mississippi earnings.

When a community believes that it can support a plant, with profit both to itself and to the plant owner, it asks permission first from the board. After making an economic survey of the town to determine its raw materials, labor supply and degree of labor skill, the board gives preliminary approval to the community. The manufacturer-prospect is then approached and an offer is made to build a plant for him if he will move his operations to town. No capital investment is required of the manufacturer.



Another BAWI-built food plant at Hattiesburg, Mississippi. This is one of the thirty-five industries that have been brought into the state under this program.

Before a contract is signed, the board must give final sanction to the community leaders. It does this only after carefully screening all the facts, taking into account the community's ability to furnish labor and raw materials from its immediate vicinity to the plant operator, the operator's integrity and business standing, and even the chances of future markets for the operator's products. No fly-by-night industries are wanted.

Selling the Community the Idea

The plant is paid for by a community bond issue. To convince the ordinary Joe Citizen of a community, whose "yes" or "no" on the election ballot is the final test of BAWI's success because he must O.K. every bond issue, the board furnishes community leaders with what is known as the "BAWI Action Kit." This contains, in addition to such vital information as tax laws and a copy of BAWI's enabling law, a kit of selling tools in the form of prepared advertisements, speeches, news releases, and newspaper editorials and cartoons for use in local papers. The success which the leaders have had may be measured by the fact that in no single instance have voters refused to O.K. a BAWI bond issue.

Our Farmers are
FOR NEW INDUSTRY BONDS
Help Put (Town) Out Front For Sound Prosperity
Vote For New INDUSTRY BONDS TUESDAY MONTH DATE
COMMUNITY ACTION COMMITTEE

One of a series of advertisements used to sell the BAWI plan to the community voters within the state. To date, voters have put their O.K. on every proposed factory-building issue that has been placed before them.

The results thus far obtained under the BAWI seem to indicate the soundness of the program. It is the aim of the leaders not only to bring industry to the communities but also to discourage the indiscriminate competition of town against town. The plan sets up safeguards to prevent towns from saddling themselves with industries that are foredoomed to fail. It attempts to encourage industries based on the state's natural sources.

Retiring the Obligation

The manufacturer operating a plant under this setup can (1) repay the community by retiring its bonds, after which the factory becomes his property, (2) lease it under a contract to maintain an annual payroll for at least ten years equal at least to the amount of the bond issue, or (3) lease it for a five year term, with an option to buy it outright if he wishes for a stipulated figure at the end of five years. The rent he pays is deducted from the final purchase price under this last plan.

[1] Balance Agriculture With Industry. Mississippi—1944—Law. House Bill 176.

How Scale Prevention Cuts Bottle Washing Cost

PART I—When scale accumulates in a bottle washer, more power is required, the capacity is reduced, machine wear is increased, and chemicals are wasted. This installment tells how to remove scale and how to prevent its formation

By PERRY E. PIPER, Pep Laboratories, Cleveland, Ohio

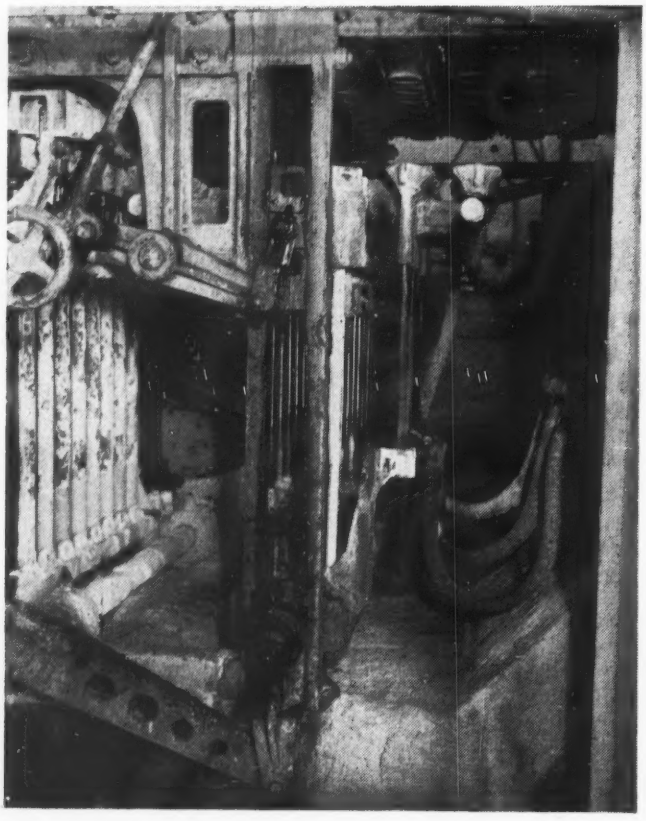
ONE of the most difficult operating problems in any plant where returnable bottles are filled is that of their effective cleaning and sterilization. In the dairy plant, this problem is more difficult, because milk bottles serve as general catchalls and for many uses other than as containers for milk and milk products. Such practices complicate the problem of finding the most effective method for the washing and sterilizing of the returned bottles. In this case, the contamination and dirt to be removed can be regarded as a mixture of solid matter held together and onto the glass by the binding action of a fatty film of dried milk.

Two Steps Necessary

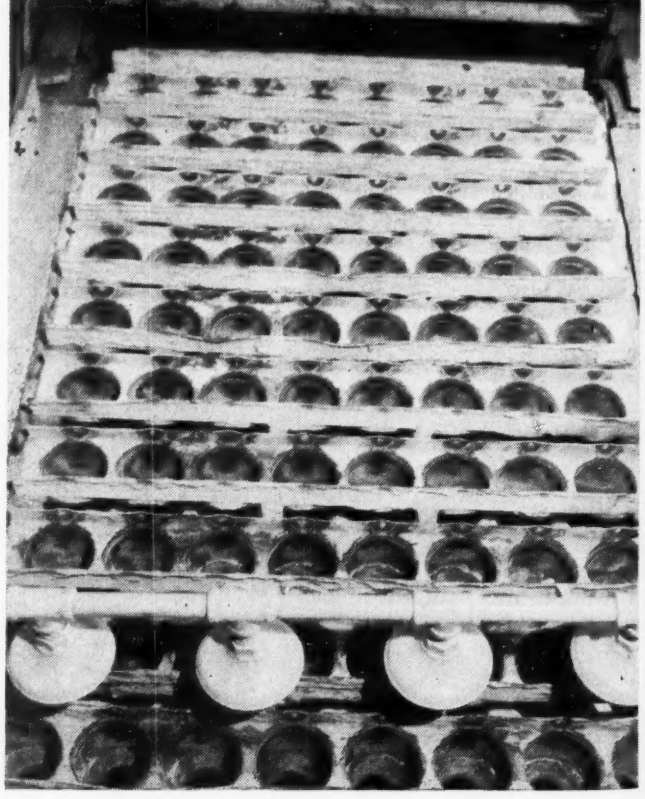
Two steps are necessary in order to clean the bottles. One is commonly known as "saponification" of the fatty material. The other is emulsification of this water-solids mixture to facilitate its removal from the bottle. Saponification is the chemical process by which the fatty material is broken down into soap and soap-like products by the action of alkaline solutions. Emulsification is the physical separation of the dirt into small particles, and the coating of each particle with a film of the solution so that it can be carried away with the rinse water.

There are a few chemicals that can accomplish these two steps while in their simple chemical form. Experience has taught us, however, that it is best to use complex chemicals that have been developed to do the job without the formation of harmful and unwanted byproducts such as scale and sludge.

The ideal bottle-washing compound must be able to saponify the fat and emulsify the dirt particles. It must



Scale formation produced in the rinse tank of a soaker-type milk bottle washer using untreated hard water.



Deposits of scale and minerals on the bottle conveyor of a soaker-type washer where hard water was used.

also possess a certain amount of wetting ability to enable the solution to get under the foreign matter in the bottles. The need for this combination of properties is greatest in the beverage field, where it is necessary to remove sticky, sirup residues and, quite often, labels that must be strained out of the solution. The washing solution is weakened and diluted by dissolved glue and other products. Chemicals with a high wetting ability aid in the attainment of these results and a wider use of them can be expected.

The wetting ability of a washing compound aids in the removal of dirt from the bottles. It greatly reduces the amount of byproduct formations that adhere to the machine and in time cause operating hardships and greatly increased costs. These benefits are due to the more complete dispersion of the cleaning material throughout the washing solution so that the foreign matter can be removed easily from the bottles and be carried away with the rinse water.

Hardness of water, the number of bottles washed, the type of bottle, the type and condition of the washer, and other similar factors make it imperative that the plant operator exercise great care in selecting the cleaning compounds to be used in his particular plant.

Scale Formation

Perhaps no other problem has caused so much concern in the bottling plant as the formation of scale on the washer parts when hard water is used. Dull, lusterless and half-cleaned bottles are often the result of the reaction of cleaning compounds with the water, as well as of the precipitation of salts in hard water when it is heated. The greater part of the salts are precipitated in the first rinse tank where the untreated water is mixed with the concentrated alkaline solution that is carried over from the soaker compartment.

There are several objections to the formation of such scale deposits on bottle washers:

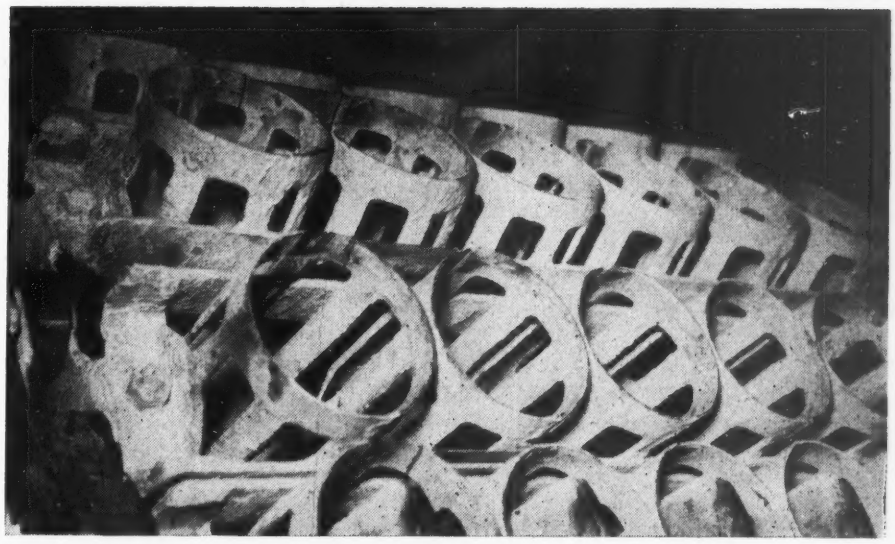
1. The formation of scale on the baskets and framework of the washer causes a great increase in the weight of the baskets, with the result that the power required to operate the washer is greatly increased. This increase in power requirements necessitates larger motors with a corresponding increase in the electric current consumption.

2. The scale usually contains a high percentage of precipitated magnesium and calcium salts combined with organic matter (Table I), which act as a sponge. If this scale is allowed to form, the washing solution is soaked up as the baskets travel through the soaker-type tank to the rinsing compartment. The rinse water flushes this solution from the scale into the drain and it is lost for cleaning purposes. The spongy scale on the baskets, now saturated with rinse water, returns to the solution tank. In this way the washing solution is diluted and weakened in effectiveness. One bottling plant cut its chemical usage 65 percent by merely descaling the bottle washer and using a scale-inhibiting compound.

3. The formation of scale on the washer parts lowers the operating speed so that a washer rated at 110 bottles per min. may deliver as few as 85 per min. Since the filling operation is usually the bottleneck of a dairy plant, the slowing down of the bottle washer greatly reduces the efficiency of the entire plant.

4. Scale is an excellent insulator, and its formation on the heating coils greatly increases the cost of maintaining proper temperatures.

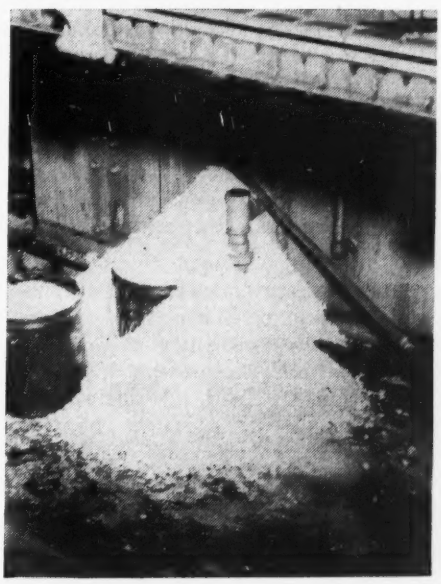
With the formation of heavy coatings of scale on washer parts there is a great increase in the wear and tear on the machine. One plant operator weighed the scale removed from a washer during a descaling operation and found that more than a ton of scale and lime had been deposited on the baskets and framework of the machine. Chains, conveyors, pipelines and motors are not built to carry such a load without possible failures.



Scale formation on carrier bars and chains of milk bottle washer greatly increases the power requirements and interferes with the washing and sterilization of bottles.

TABLE I—Typical Scale Analyses

Scale Composition	Chain scale, percent	Chain scale, percent
Tricalcium phosphate	62.3	44.4
Calcium carbonate	5.0	23.0
Magnesium silicate	10.4	6.0
Magnesium phosphate	...	1.4
Calcium and magnesium soaps	17.7	21.4
Sodium hydroxide	1.2	0.4
Sodium carbonate	3.0	1.8
Undetermined	0.4	1.6
	100.0	100.0



Seriousness of scale formation is shown by the 600 lb. of scale removed mechanically from a milk bottle washing machine.

How to Prevent Scale

Several things can be done about scale formation. First, the water used in the plant can be softened; secondly, the scale can be removed; and lastly, its formation can be prevented by the use of selected polyphosphates.

(*Turn to page* 224)

Posed photograph showing steps in floor construction. Note roughness of base slab and stiffness of concrete mix being spread with rake and shovel. Concrete is then tamped A, screeded B, and floated with mechanical floats C. These operations are followed by troweling and curing.

Designing the Proper Concrete Floors For the Food Plant

Correct proportions of cement, sand, aggregate and water, mixed and treated as described, will produce floors that are unaffected by acids, corrosive materials, impact and rapid temperature changes encountered in food plants

By R. D. RADER
Portland Cement Information Bureau, San Francisco, Calif.

SOME of the solutions resulting from processing products in food and beverage plants have little if any effect upon impervious concrete floors but they will attack concrete surfaces of inferior quality.[1] The daily wetting, with mild organic acids, which occurs in many food plants, tends to build up an acid concentration that eventually causes disintegration of the floor surface. Various salts and sugar solutions form crystals in the void spaces of porous concrete. As these crystal accumulations grow in size, they exert a force sufficient to rupture the bond between sand and cement, thus causing the gradual disintegration of the cement floor. The smoothness and density of properly constructed floors, their low absorption, and their freedom from pits and crevices prevent the accumulation of liquids and also make good housekeeping and sanitation relatively easy.

Subgrade Important

In building concrete floors on the ground, the preparation of a subgrade to support the slab is of first importance. Uniformity of compaction is as important as the degree of compaction because all designs of slabs assume a uniform bearing capacity. A concrete slab can be designed to support a given load over a subgrade of low, but uniform, bearing value. A subgrade of generally high bearing value, but with a few weak spots, requires that the whole slab be designed for the weak spots.

To prepare the subgrade, all sod must be removed from the surface. Because of its organic content, it should not be used later for fill material. If the floor is to be cast directly upon the original soil, the grading must be done carefully, particularly the final grading, so that all the subgrade will be in its natural state.

Where fill is required, it should be built up in layers not exceeding 6 in. in thickness, and each layer should be thoroughly compacted by tamping or rolling. Holes or irregularities in the natural grade should be filled in layers and compacted before the main fill is placed. All layers should be made approximately parallel to the plane of the floor. Pipe trenches and holes made for footings should be backfilled in this manner and each

layer tamped until it is as dense as the remainder of the subgrade.

For best results and greatest density, there is an optimum moisture content for each fill material. A rough idea of the moisture content of ordinary soils, except very sandy ones, may be obtained by squeezing some in the hand. With proper moisture content, the soil will cling together but will not be plastic or muddy. If the fill is overly wet, it must be allowed to dry partially before rolling or tamping. Drying can be accelerated by loosening the soil with a harrow.

Drainage

After the subgrade has been thoroughly compacted, the next step is to provide an efficient drainage course under the floor. Unless the soil is sufficiently sandy to offer natural drainage, the subgrade should be finished from 4 to 6 in. below the elevation shown by the plans for the bottom of the floor. This low subgrade is filled with a layer of sand, gravel or cinders and then compacted (Fig. 1). Material used should be of uniform character and should not contain large lumps, stones, frozen chunks, or material that will rot. Filling the interstices between the granular particles with material such as clay destroys its value as a drainage course.

Where the ground surface is sloping, drains can be laid along the footings at the lowest excavated level. These drains should be carried to a point where they intersect the surface of the ground so that the water will drain off by gravity. All drains should be given a slight slope and should be formed by laying concrete tile at the bottom of a trench, covering the joints with building paper, and then backfilling with sand or sandy gravel to a depth of at least one foot. If the ground is level and the water table is high, it may be necessary to lead drains to a sump and provide an automatic electric pump to keep the water level below the floor.

Floor surface drainage is provided by pitching the floor to drainage outlets. Because of the amount of water used in food processing plants, it is often necessary to pitch several sections of the floor to separate drains, all of which flow to a refuse collector and then to the sewer.

A slab thickness of 4 to 5 in. over a uniformly compacted subgrade having a bearing value of 10 to 20 psi. is sufficient for light loads such as the weight of people and of hand-propelled push carts or stacked cases of canned goods piled at moderate heights. Floors used by light delivery trucks and vehicles with about the same loadings as passenger cars require a 6-in. slab with a uniform subgrade bearing value of 10 psi. or more.

Floors subject to traffic by highway cargo trucks or similar loads should be designed in accordance with Westergaard's formulas, which take into consideration the load-bearing capacity of the soil, the actual strength of the concrete to be used, the maximum wheel loads, the size of tires and their air pressures.[2]

Machine bases and column footings should be built before the floor is placed and should be designed for the loads they are to carry. Columns and bases may settle slightly and machines often develop vibration sufficient to crack floors. To eliminate this, a strip of ½-in. premolded joint filler should be placed around the column footings and machine bases.

Concrete Quality

The strength of concrete is governed by the water-cement ratio law for concrete mixes, which is stated thus: "For plastic mixtures, using sound and clean aggregates, the strength and other desirable proper-

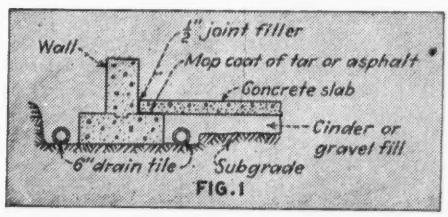


FIG. 1. Concrete floor laid over fill. Note details of joint at wall footing, location of drain tile and cinder or gravel fill.

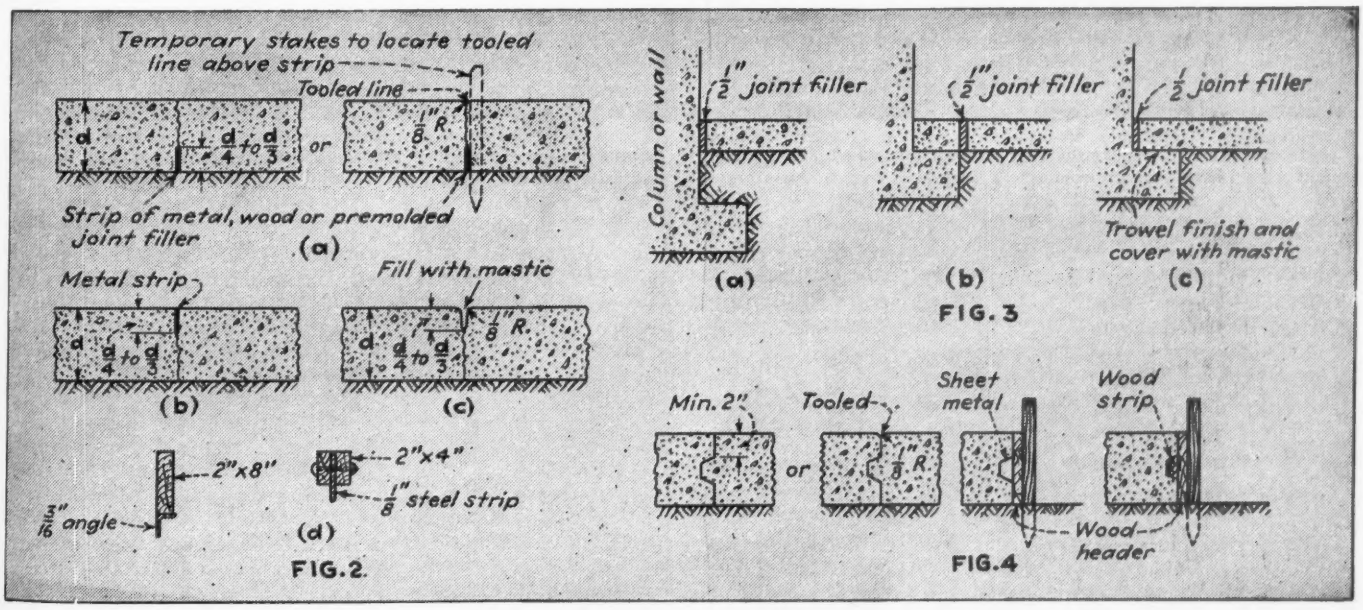


FIG. 2. Contraction Joints. (a) The simplest type is made by placing a metal, wood or premolded filler strip in the bottom of the slab to weaken it. (b) The metal strip forming the joint may be supported from the subgrade during concrete placing, or inserted in a groove similar to the one shown in (c). Top of the strip should be flush with the surface of the slab. (c) This joint is made by cutting a groove in the slab, by pressing either of the tools (d) into it or by removing a metal strip that has been temporarily cast in the concrete slab.

FIG. 3. Expansion Joints at Walls and Columns. The joint filler may be poured or premolded. When the latter is used it should stop about 1 in. from the top, and poured material used to finish the fill.

FIG. 4. Construction joints. A simple joint which will transfer the load between slabs can be made either by a standard sheet metal road form or by nailing a beveled wood strip to the bulkhead.

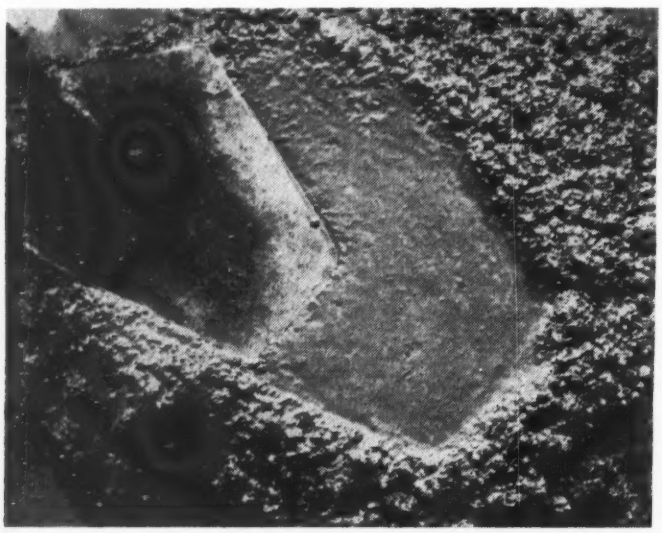
ties of concrete under given job conditions are governed by the net quantity of mixing water used per sack of portland cement." This means that the strength of concrete under a given set of conditions is determined by the number of gallons of water (including the moisture contained in the sand and gravel) used for each sack of cement.[3] In the average food or beverage plant, a flexural or beam strength of 600 psi., or roughly a compressive strength of 4,000 psi., should be adequate for floors.[3]

From actual tests it has been found that these strengths will usually be secured in 28 days when not more than 6 gal. of water are used per sack of cement. To secure the best kind of floor, the cement should be vibrated into place. When mechanical vibrators are used, the amount of water in the mix should be reduced to 5 gal. per sack of cement. Proportions of 1 part portland cement, 2 parts fine aggregate well-graded from ¼ in. down, and 3 parts coarse aggregate, well-graded in size from ¼ in. up to 1½ in., may be used as a trial mixture for one-course floors. The slump[3] should not exceed 3 in. Adjustments of this trial mixture should be made by slightly decreasing the amount of water, sand, or both, until the slump is as low as practicable while still providing workable concrete.

After all materials are in the mixer, the concrete should be mixed for not less than one minute. Strength and durability increase with mixing times up to ten or more minutes, but one full minute will provide sufficient strength without unnecessary delay to construction operations. Low-slump, dense concrete for floors can be made best in stationary mixers. Transit mixers operate more slowly than the ordinary stationary mixers and require from ten to twelve minutes to mix a load of concrete. This concrete usually contains more water than that made in a stationary mixer.

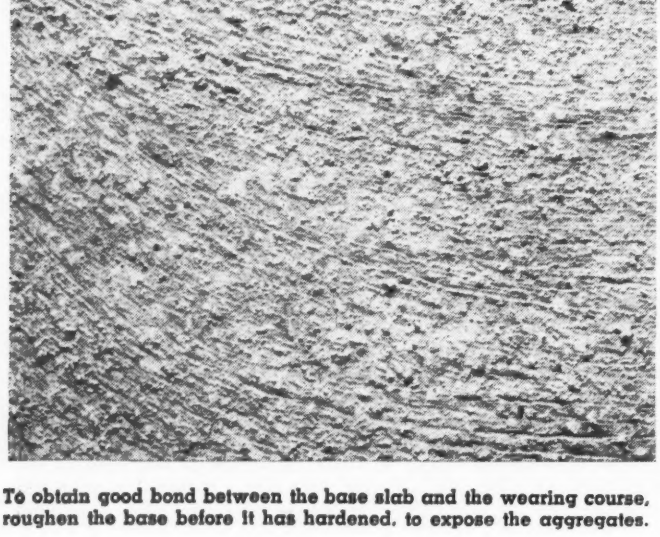
Curing is one of the most important operations in the making of quality concrete. Concrete hardens because of chemical reactions between portland cement and water. Curing consists of keeping the concrete damp for at least seven days after it has been placed. Tests have proven that concrete cured in this manner is about 70 percent stronger than if allowed to dry immediately after placing.

Concrete hardens very slowly at temperatures below 50 deg. F. and



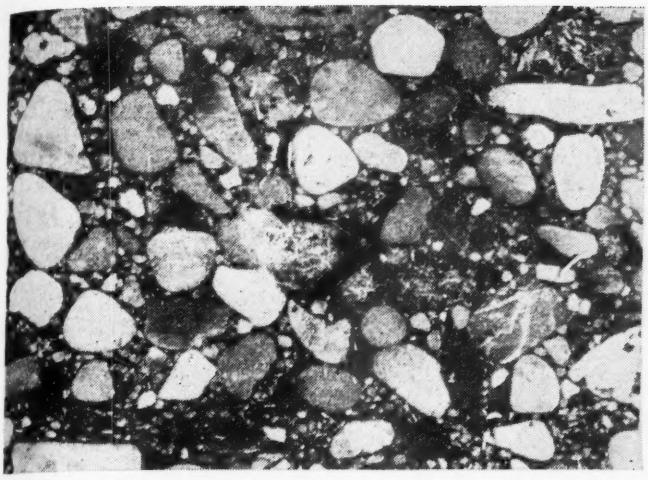
A good concrete mix for heavy-duty floor finishes contains 1 part cement, 1 part sand and approximately 2 parts of coarse aggregate.

Cement and sand mortar should never be used for heavy-duty floors, and for that matter should be avoided for light traffic.

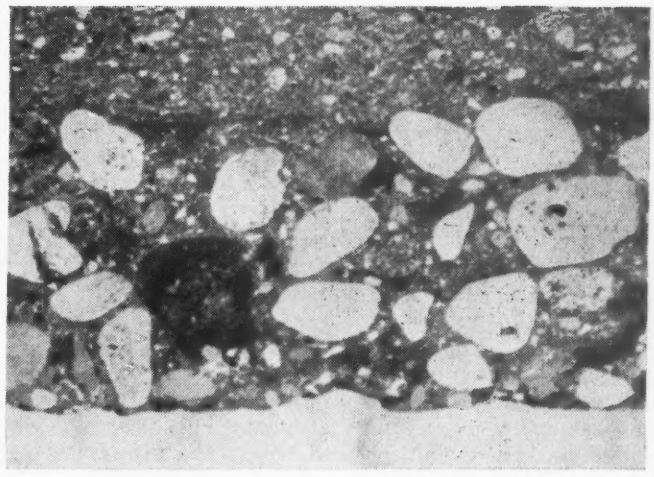


To obtain good bond between the base slab and the wearing course, roughen the base before it has hardened, to expose the aggregates.

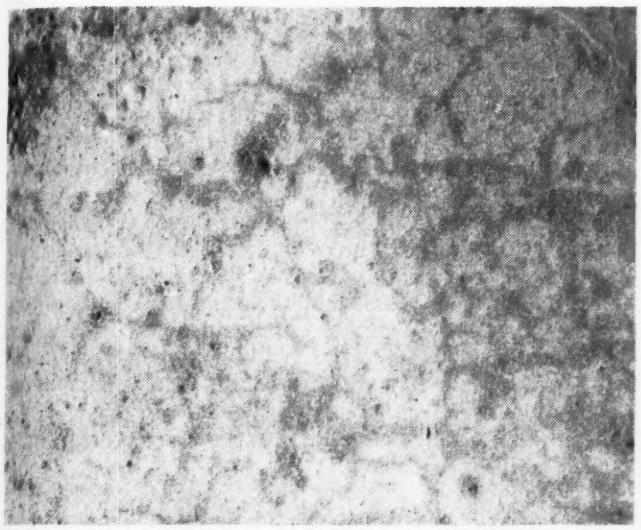
When finishing the wearing course first strike off the topping to grade, then compact and float. Trowel after water has disappeared.



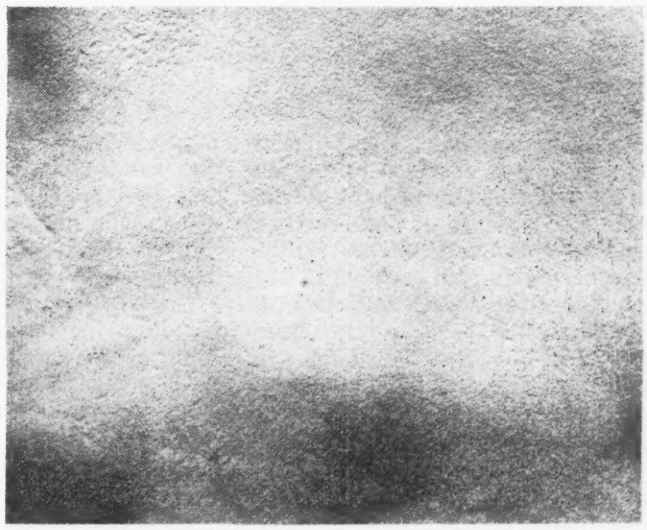
Sawed section of a properly constructed floor slab showing topping made with pea-gravel aggregate. Note that aggregate particles are at the surface to take the wearing action of trucks and other traffic. There is no film of laitance or weak mortar at the surface.



Sawed section of floor slab with topping of mortar. A layer of weak material, caused by over-troweling, is revealed at the surface. This has little strength, it shrinks badly, causing crazing, followed by dusting and disintegration under traffic.



Crazing of the surface of a concrete floor is evidence of excessive shrinkage occurring before strength has been developed. It frequently results when mortar is used for the wearing surface.



Drying of the surface moisture before troweling must proceed naturally and not be hastened by dusting on dry sand or cement. By delaying troweling all the materials will remain where deposited.

the hardening practically ceases at freezing temperatures. It should, therefore, be protected from freezing until sufficient strength is gained to withstand frost. When necessary, heat should be furnished to maintain a reasonable temperature in the slab.

On leaving the mixer, fresh concrete should be free from ice or frozen lumps and should have a temperature of from 70 to 80 deg. F. Higher temperatures will cause more rapid setting. Heating only the mixing water is often sufficient. In other cases it may be necessary to heat both water and aggregate to meet these requirements. When using normal portland cement, the concrete temperature should be maintained above 70 deg. F. for at least three days, or above 50 deg. F. for at least five days. When using high, early-strength portland cement, the temperature should be kept at above 70 deg. F. for at least two days or above 50 deg. F. for three days. The floor should be kept wet during this period.

Warm concrete placed on a very cold, hardened slab will not bond well. The temperature of the hardened slab should be as near to that of the new concrete as possible, otherwise the top course may shrink and break away from the slab.

Construction Finishes

There are two general methods of finishing concrete floors. One is to trowel and float the surface of the base slab without the addition of a concrete "topping" or wearing surface. This is called a one-course floor slab. The other method is to add one inch or more of concrete on top of the base slab, thus making a two-course floor.

The one-course slab has the advantage of being monolithic, hence has no topping course which may "peel" off. It is also more economical to lay than a two-course slab.

In food and beverage plants, where floors are subject to attack by liquids and abrasive wear from traffic, concrete surfaces must be finished to resist such attacks. After the low-slump concrete has been vibrated or tamped into place, it should be struck off to the proper elevation or slope. It is then floated to smooth the surface. Mechanical floating is much more efficient than hand floating, as the machines will smooth and compact much drier concrete mixtures than can be done by hand. The slab should be allowed to stand until all water sheen has disappeared before

troweling. Usually, because of the much drier mixture used, troweling can be done immediately after machine floating. If it has been floated by hand, troweling should not be done until the concrete is fairly hard. A final troweling is necessary, but it should not be done until the concrete is so hard that no mortar accumulates on the trowel and a ringing sound is produced as the trowel is drawn over the surface.

Types of Joints

Three kinds of joints—contraction, expansion and construction—provide for the expansion and contraction of concrete. Since initial shrinkage of concrete is greater than any subsequent expansion due to moisture or temperature changes that may be expected in ordinary floors, contraction joints are the most important.

These joints are weakened planes placed at intervals in the concrete to control the cracking which may occur due to shrinkage. One form of contraction joint is obtained by forcing the edge of a flat steel bar into the concrete to a depth of one-fourth to one-third of the floor thickness while the concrete is still soft (Fig. 2). Such joints are spaced uniformly at 15 to 30 ft. intervals. In large floors they are in line with the columns, in small floors they may be placed under partitions. As the concrete hardens and contracts, narrow cracks may open along the bottoms of these joints. To prevent these cracks from filling with dirt, the grooves made by forcing the steel bar into the concrete should be filled with melted roofing asphalt to which has been added about 25 percent of SC-6 road oil.

Expansion joints allow space for the concrete to expand when the temperature rises (Fig. 3). Such joints are formed by leaving a ½- to ¾-in. space around column footings and machine bases, between concrete slabs, or between concrete slabs and adjacent walls. It is common practice to design floors built on the ground with an expansion joint all around the edge of the slab. This joint allows for expansion and also acts as a seal to keep ground moisture from penetrating the edges of the slab.

The thermal coefficient of expansion for concrete varies slightly for various mixes and aggregates, but is usually taken as 0.000005 ft. of expansion per ft. of slab length per deg. F. of increase in temperature. Hence, for a 30 ft. slab with a 50-deg. F. increase in temperature, the expansion would be $0.000005 \times 30 \times 50 = 0.0075$ ft. or 0.09 in.

Expansion takes place only when the temperature of the concrete rises above the temperature at which it was originally placed. If the floor slab is cast when the temperature of the air happens to be 60 deg. F., expansion will occur only when the temperature rises above that figure and contraction takes place when it drops below.

Because it is rarely possible to complete a large industrial floor in one day, it is cutomary to cast the slabs in strips from 20 to 25 ft. wide. These strips are controlled for line and grade by side forms of wood or steel. Construction joints between the strips are usually of the tongue and groove variety (Fig. 4), or are made with steel dowels that tie the edges of the slabs together. The purpose is to transmit loads, caused by vehicle wheels moving across the joints, from one slab to the next. Edges and corners are the weakest parts of a slab, but if adjacent edges are tied or keyed together so that they act in unison, most of the weakness is obviated.

Two-course Floors

The principal advantage of a topping course is that it can be placed with a lower water-cement ratio and. therefore, a greater density, making it more impervious than is possible with a base slab alone. For this kind of floor, the slab is cast as previously described except that the partially hardened base is brushed with a stiff wire broom to clean and score the surface to assure uniformity of bond.[4] The surface of the hardened base must be clean, free from laitance, and suitably roughened. If the base has been completed for some time and allowed to dry out, it should be kept wet for several hours before the top course is placed, but there should be no free water on it. A slush coat of equal parts of cement and fine sand wetted to the consistency of thick paint should then be broomed into and over the surface. The topping should be placed at once, before the slush coat begins to dry out. This topping should consist of 1 part of cement, 1 part sand, and 1½ parts of pea gravel or fine crushed rock from ⅛ to ⅜ in. in size. The water content of this top course should not exceed 4½ to 5 gal. per sack of cement, and this must include surface moisture of the sand and gravel.

Sand for topping should consist mainly of the coarser grains, ranging from 1/16 to ¼ in. in size, with not over 15 percent of the grains passing through a 50-mesh screen. Coarse aggregate should be well-graded from ¼ to ⅜ in. in size and should be hard and durable. If a non-skid surface is wanted—and this is very desirable from a safety standpoint where spillage of liquids may make floors slippery—a small amount of one of the non-slip aggregates, such as alundum, should be spread evenly over the concrete before it hardens and thoroughly troweled into the surface. This non-skid treatment is also applicable to one-course floors.

Floor topping is placed by spreading, tamping, rolling, floating and troweling, hence a stiff mixture can be used. Mechanical floats will compact and finish topping that is so stiff that it cannot be finished by hand.

Armored floors are made by reinforcing concrete with a special metal grid. The metal grid protects the surface against damage from impact and from wear of heavy and abrasive traffic, such as steel-tired trucks. This floor is not recommended where it is subject to acid or alkali attack. The armor should be installed according to the manufacturer's recommendations, with the top surface of the grid at the exact level of the finished floor. The concrete should be made, placed, finished, and cured as previously described.

If color is to be added in the topping, it should be carefully weighed into each batch of cement and aggregates, and thoroughly dry-mixed before adding water. If preferred, the pigment can be added to the cement and mixed to a uniform color before the cement is combined with aggregates and placed in the mixer. The best colors for concrete are mineral pigments and the amount used should not exceed 10 percent by weight of the cement.

Surface Treatments

After concrete floors have been thoroughly cured they may be further hardened by several treatments, one of the best of which is the use of fluosilicate. The best results have been secured by using 20 percent zinc fluosilicate and 80 percent magnesium fluosilicate and dissolving 0.5 lb. to each gallon of water used in the first application. The proportions for subsequent applications should be increased to 2 lb. per gal. The solution should be applied two

(*Turn to page* 222)

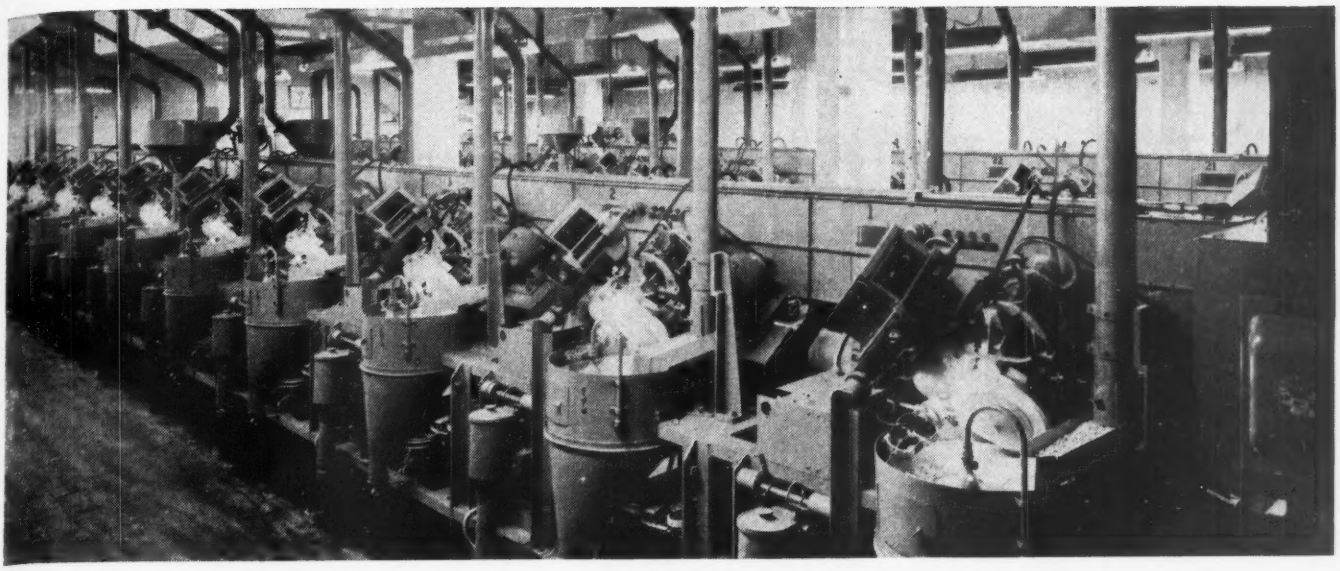


FIG. 1. A battery of electronic sorting machines separating unacceptable beans from good ones on the basis of their color range. RCA phototubes and RCA cathode-ray tubes control the mechanism.

Bad Beans Given the "Bounce"

Here is a rapid, automatic way of controlling the quality of beans, coffee, peanuts and even potatoes. An ingenious electronic sorting mechanism separates the bad food from the good, on the basis of the color range of light reflected from its surface

ELECTRONIC sorting machines, manufactured by the Electric Sorting Machine Co., Grand Rapids, Mich., provide a speedy, foolproof and mechanical means of sorting the bad beans from the good ones by employing RCA phototubes, cathode-ray tubes and control tubes. Acceptance or rejection of each bean is dependent upon the precentages of red and green light reflected by it. Use of the machine is not limited to various kinds of beans. It works out on peanuts, coffee, seed corn and even potatoes. Installations consist of a battery of at least 16 machines (Fig. 1).

Beans are fed into a rotary feed by means of a feed chute (Fig. 2). The mechanism feeds the beans, one at a time, through an optical system consisting of an incandescent lamp, a focusing lens, two mirrors and two phototubes. Light from the incandescent lamp is reflected by the bean through the lens, where it is focused on to the first of the two mirrors. This mirror, known as a "partial" or "50 percent" mirror, reflects part of the light through a red color filter to the phototube nearest to the light source. Another part of the light is transmitted to the second mirror, which reflects it through a green color filter to a second phototube. The first phototube is especially sensitive to red light and the second to green light.

By feeding the output of both phototubes through an amplifier to

(*Turn to page* 228)

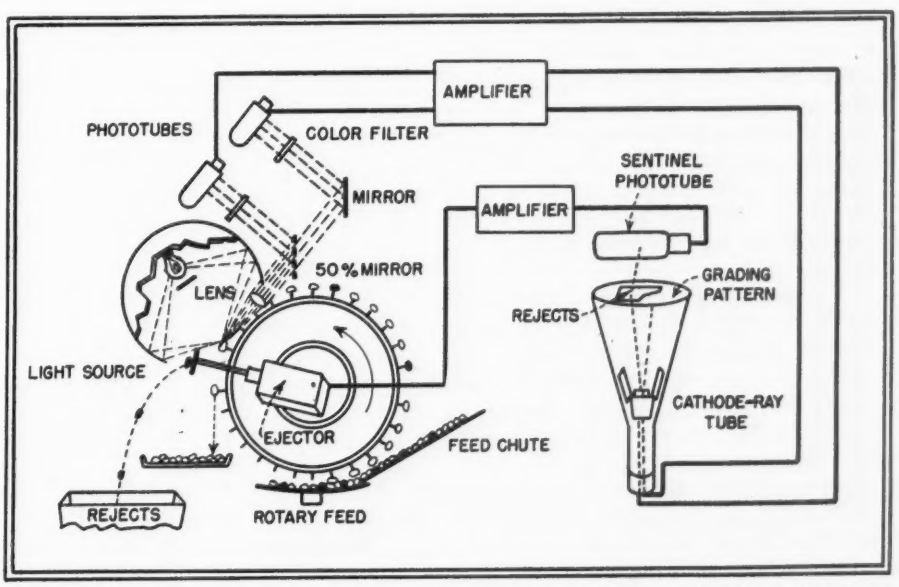


FIG. 2. Diagram of an electronic sorting machine. The degree of the electron beam deflection in the cathode-ray tube is governed by the amounts of red and green light reaching the phototubes. Deflection of the beam outside the masked area on the face of the cathode-ray tube activates an ejector mechanism.

Card System Controls Fleet Inspections

The preventive maintenance system, used by the National Tea Co., for its fleet delivering groceries to 484 stores in the Chicago area, sets a definite mileage interval and provides a means for determining when that interval occurs for each truck

THREE forms are employed in the preventive truck maintenance system used by the National Tea Co., large wholesale grocers with 484 retail stores in the Chicago area. The system emphasizes the fact that it is easy enough to set up such a preventive maintenance system by which the vehicles in a fleet are to be inspected at certain mileage intervals, but not so easy to determine just when each truck has reached its inspection point.

The difficulty increases as the fleet grows in size and the individual units in the fleet are rotated between short- and long-mileage routes in accordance with the requirements of the delivery operations. The trouble rests in keeping track of the mileage of each individual unit in the fleet, when the last inspection called for in the preventive maintenance system was made, and when the truck has been operated for sufficient miles to make its total mileage equal to that at which the next inspection should be made on the assumed mileage interval.

These mileage intervals vary from 1,000 to 5,000 miles and even to 10,000, 20,000 or 30,000 miles, depending upon the severity of the truck operation and the degree of care the fleet owner desires to give his equipment. In some cases the mechanical operations called for in the 1,000-mile inspection are repeated indefinitely after each 1,000 miles of operation. In other cases, different and more thorough operations are made at each of the 10,000-, 20,000- or 30,000-mile intervals.

In the case of the National Tea Co., which operates a fleet of fifty-nine heavy-duty tractors and trailers, and which covered 1,316,914 miles in 1945, the 1,000-mile interval has been adopted. The items covered and the operations made in each 1,000-mile inspection are as shown on the form in the accompanying Fig. 3. These inspections are repeated after each interval of 1,000 miles of operation.

The form shown in Fig. 3 is one of the three forms used in the National Tea system. The remaining two forms are the individual vehicle mileage record shown in Fig. 2, and the middle part of the driver's report shown in Fig. 1.

The individual vehicle mileage record form, in Fig. 2, is made out for each vehicle in the fleet by the man who dispenses gasoline to the trucks and tractors. As shown, it is made out by periods, a period being one of the thirteen equal 4-week intervals into which the company divides its sales and expense records.

The mileage of the given vehicle at the beginning of the period is entered at the top of the form. Then, each day as the vehicle is operated, the miles run are entered in one column and made accumulative in the next column. When the total mileage run approximates 1,000 miles, the gas

Speedometer Finished 37796
Speedometer Started 37726 TOTAL MILES 70
F-915-R. 5th Period 1946 **DRIVERS REPORT** (1) 3258

Load Record No. 14564	Day Friday	Date May 24, 1946

Temperature 60 °	Hum. — %	Fog —	Rain ✓	Snow —

Tractor	Trailer	Driver's Name	Helper's Name
1207	1261 A	John Wayne	Wm. Smith

No. Stops	Farthest Stop from Warehouse

Tractor	Trailer	Driver's Name	Helper's Name
1207	1261A	John Wayne	Wm - Smith

Quarts of Anti-Freeze Solution	Quarts of Oil	Gallons of Gasoline Pump No.	Gallons of Gasoline Quantity	(2) 3258
✓	2	2	17	Date 5/24/46

Speedometer Finished	Speedometer Started	Total Miles
37,796	37,726	70

Tractor	Trailer	Driver's Name	
1207	1261A	John Wayne	Date May 24, 1946

Remarks	Turn Signals	Report Turned In	Any Accidents	Engine	Chassis	Body	Tires	Horn	Rear View Mirror	Windshield Wiper	Reflectors	Stop Light	Marker Lights	Lights	Steering	Brakes
—	✓	✓	No	Misses	✓	✓	✓	✓	✓	Ex	✓	✓	✓	✓	✓	Adjust

(3) 3258

If more space is needed, use lower half of card on reverse side.

FIG. 1. The driver's report is in three parts. The middle portion is the one used to determine the 1,000-mile intervals that mean another inspection is due for the truck.

dispenser sends a memorandum to the shop foreman that the vehicle is due for an inspection.

The shop foreman then issues a work order to one of his mechanics to make the inspection that night, or to hold the vehicle in the shop the next day, according to the requirements of the delivery operations. So that the mechanic will not overlook any of the parts to be inspected, repaired or adjusted, as the case may be, he uses the form shown in Fig. 3 as his worksheet. He marks this sheet, as shown, and returns it to the shop office with the mileage reading at which the inspection was made. This reading is transferred by memorandum to the gas dispenser, who enters it on the Fig. 2 mileage sheet. The next inspection is due 1,000 miles later.

The gas dispenser does not attempt to fill out the mileage sheet by having the driver call out his speedometer reading at the time he gets gasoline. This would delay and increase the time of the gassing operation for which the driver is paid. The latter's time does not end until his vehicle is gassed and returned to the garage. Instead he uses one part of the driver's report, shown in Fig. 1.

The driver's report is a manila card divided into three parts by horizontal perforations. The top part is used to record the operating data of the day's work, such as the weight of the load carried and the code numbers of the stores served; the middle section of the card gives the starting and finishing speedometer readings and the mileage run and the bottom portion is a faulty condition report used to indicate any mechanical troubles that may have developed during the day's work.

When the driver finishes at night, he tears the card in three parts. The top goes to the operating department office and the other two parts to the garage. The bottom part is used to make any necessary running repairs that night. The middle section is collected, transferred to the gas dispenser on the following day and used by him to build up the mileage records.

The gas dispenser does the above paper work, along with keeping his gasoline inventory, during the least busy periods of the day, usually in the morning, when the vehicles do not line up, one after the other to get fuel as they do at the end of the day. In this manner, the gas dispenser has a full day and it is not necessary to hire an additional man to determine mileage intervals.

F 66R-W GAR. GARAGE GAS & OIL TRUCK CONSUMPTION REPORT

TOTAL MILES 4990 TRUCK NO. 1027

MILES PER. GAL. GAS 4.4 GALS. GAS 1139 AMOUNT $ 157 20 PER 100 6 10 45

MILES PER QT. OIL 146.8 QTS. OIL 34 AMOUNT $ 3.01 TOTAL COST $ 160 21

DATE	NO. METER	MILEAGE DAY	MILEAGE NITE	MILEAGE TOTAL	GASOLINE OUR PUMPS	GASOLINE MISC.	GASOLINE RD. PURCHASE GALS.	GASOLINE RD. PURCHASE AMT.	OIL RD. PURCHASE QT.	OIL RD. PURCHASE AMT.	OIL ADD	OIL DRAIN
	33244			770								
5-21	"		95	95	79							
5-21	"	82		177	21½							
5-22	"		100	277	41½							
5-22	"	30		307	9							
5-28	"		58	923	10½							
5-28	"	41		964	11		Inspection made					
5-29	"	547		1511			25	4.62				
6-15	"	365		4990	48½		30	5.04			2	
				4990	889		250		2		5	27

1027

FIG. 2. This shows the individual vehicle mileage report made out by the gasoline dispenser, in his spare time, from the collected middle sections of the driver's reports. With this system, additional help to keep track of the proper mileage intervals is unnecessary.

Date 5-31-46 F. 306 3-23-43

TRUCK NO. 1207

ODT-Permit

1000 mile Inspection

Speedometer Reading 38,976

Safety Sticker 187193

State-License # X 2619 City License # 21-364 Federal Sticker # 10-400-825 Affidavit —

V-Found Satisfactory: O-Adjusted by Inspector: X-Needs Attention

MOTOR
- ✓ Tighten cylinder head bolts
- ✓ Adjust valve tappets
- O Adjust spark plug gaps
- ✓ Compression
- — #1 100 #2 100 #3 96 #4 100
- — #5 100 #6 100 #7 #8
- O Distributor, set points, lubricate
- O Breaker Cam. Set timing
- ✓ Inspect ignition wires
- ✓ Adjust fan belt
- ✓ Tighten exhaust, intake manifold
- O Check, adjust carburetor
- ✓ Tighten motor support bolts
- O Clean fuel pump
- — Fuel pump pressure
- — Fuel pump vacuum
- ✓ Governor 2650

COOLING
- — Fill radiator with cleaner
- ✓ Inspect, tighten hose connections
- ✓ Tighten water pump gland
- O Inspect for water leaks
- ✓ Tighten radiator tie rods
- ✓ Tighten radiator hold down bolts

STEERING, FRONT END
- ✓ Steering Post
- ✓ Tighten steering housing
- ✓ Steering drag link
- ✓ Steering tie rod
- — Right and left front spindle
- ✓ Tighten front spring shackles
- ✓ Tighten front spring clips
- — Align front wheels

CAB
- ✓ Left door
- ✓ Right door
- ✓ Heater
- ✓ Fender

CLUTCH, TRANS., DRIVE, REAR END
- ✓ Clutch action
- ✓ Pedal clearance
- ✓ Transmission leaks
- O Drive shaft
- ✓ Differential leaks
- ✓ Tighten axle shaft nuts
- ✓ Adjust wheel bearings
- ✓ Tighten spring clips
- ✓ Tighten spring shackles
- O Adjust brakes

ELECTRICAL
- Generator output 40 Amps.
- ✓ Wiring
- • Lights — Focus headlights
- — Fog Light None Focus
- — Road Light — Focus
- ✓ Windshield wipers
- ✓ Horn
- ✓ Battery test 12.30
- ✓ Battery cables
- ✓ Marker lights
- — Reflectors

AIR ASSEMBLIES
- ✓ Compressor
- ✓ Valves and hose connections
- ✓ Drive couplings and Diaphrams

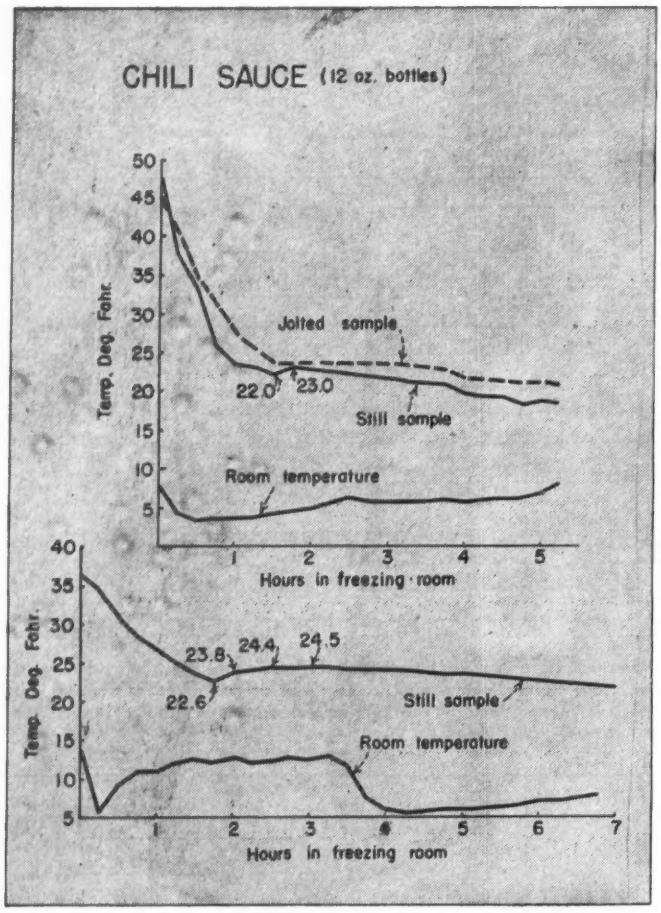
FIFTH WHEEL
- ✓ Uncoupling levers and linkage
- ✓ Track and Leg Bolts
- ✓ Draw-bar spring
- ✓ Draw-bar clamps
- — 5th. wheel yoke

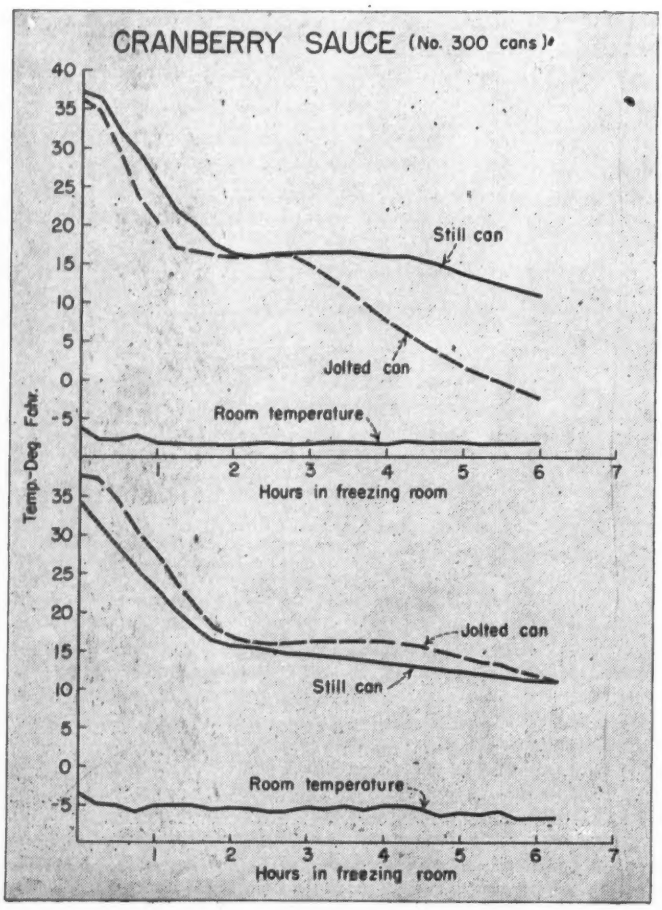
EQUIPMENT
- ✓ Jack and handle
- ✓ Tire wrench
- — Shovel
- — Skid chains
- ✓ Crank Handles
- — Tires-Lf

Bob Harmon

REMARKS:

FIG. 3. The items listed in this form cover the operations performed on each truck every 1,000 miles in the preventive maintenance system used for the National Tea Co's. fleet.





Freezing Point Data Sheets And Cooling Curves

PART III

Chili Sauce

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
12 oz. bottles:							
1—Still ...	3.2- 8.2	48.1	1¼	½	1.0	1¾	23.0
1—Jolted .	3.2- 8.2	44.8	1½	...	...	1½	23.5
2—Still ...	5.8-12.9	36.7	1¼	1¾	1.9	3	24.5

Freezing point range, 23.0°F. to 24.5°F.; average, 23.7°F.

Inspection immediately after each test showed contents frozen stiff but not hard.

Cranberry Sauce

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 300 cans:							
1—Still ...	14.7-16.9	36.9	...	...	...	...	*
1—Jolted .	14.7-16.9	36.1	...	...	...	...	*
2—Still ...	-3.2- -6.8	34.4	1¾**	4½	5.7	6¼	***
2—Jolted .	-3.2- -6.8	37.7	2¼	¾	0.2	3	16.3
3—Still ...	-1.3- -3.3	37.4	2½	¾	0.1	3¼	16.3
3—Jolted .	-1.3- -3.3	27.2	2½	¾	0.3	3¼	16.4
4—Still ...	-7.2- -8.6	37.3	2	½	0.3	2½	16.2
4—Jolted .	-7.2- -8.6	36.1	1¾	¾	0.2	2½	16.1

Freezing point range, 16.1°F. to 16.4°F.; average, 16.3°F.

*Samples in Test No. 1 did not freeze after being exposed to freezing room temperature for 6¾ hours at which time the still sample was 19.3°F. and the jolted sample 16.0°F.

**Time to reach freezing point of jolted sample in same test.

***Sample did not freeze—temperature of sample was 10.9°F after 6¼ hours in freezing room.

Inspection made immediately after the test showed ice crystals throughout, but the cranberry sauce was not frozen hard.

Creamed White Corn

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	5.8-12.9	37.3	1¼	3¾	9.7	5	30.1
1—Jolted .	5.8-12.9	36.2	1	...	...	1	30.0
2—Still ...	16.4-18.3	36.0	1½	5¼	9.2	6¾	29.0
2—Jolted .	16.4-18.3	36.0	1½	1	3.0	2½	29.3
3—Still ...	5.3- 8.3	37.2	1¼	3½	9.7	4¾	29.6
4—Still ...	16.0-19.1	32.0	¾	2¼	5.6	3	28.5
5—Jolted .	16.0-19.1	32.7	1	2	4.1	3	28.8

Freezing point range, 28.5°F. to 30.1°F.; average, 29.2°F.

Inspection made immediately after each test showed the corn and the cream sauce frozen hard to a depth of approximately ¾ in. The contents in the center of the cans were very stiff, but not frozen hard.

Hard frozen sample somewhat dull and curdled in appearance with considerable separation of the liquor.

Yellow Corn (W. K. in Brine)

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	16.0-17.5	32.7	1	3¼	6.9	4¼	29.3
1—Jolted .	16.0-17.5	32.2	½	1	0.2	1½	29.2
2—Still ...	16.3-18.3	36.2	¾*	4¾	8.6	**	**
2—Jolted .	16.3-18.3	36.2	¾	¾	2.0	1½	29.7
3—Still ...	17.7-20.4	35.5	¾	1¾	5.7	2½	29.6
3—Jolted .	17.7-20.4	35.8	¾	½	0.4	1¼	29.7

Freezing point range, 29.2°F. to 29.7°F.; average, 29.5°F.
*Hours to reach freezing point of jolted sample in same test.
**Contents had not frozen when test was ended.

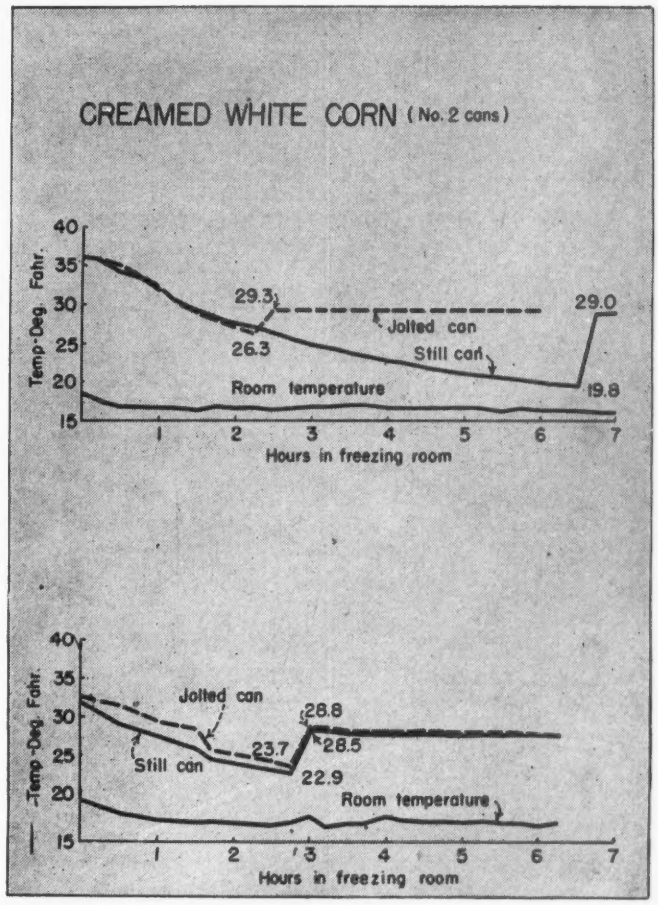
Inspection made immediately after each test showed the contents frozen stiff with the exception of the No. 2—Still sample.

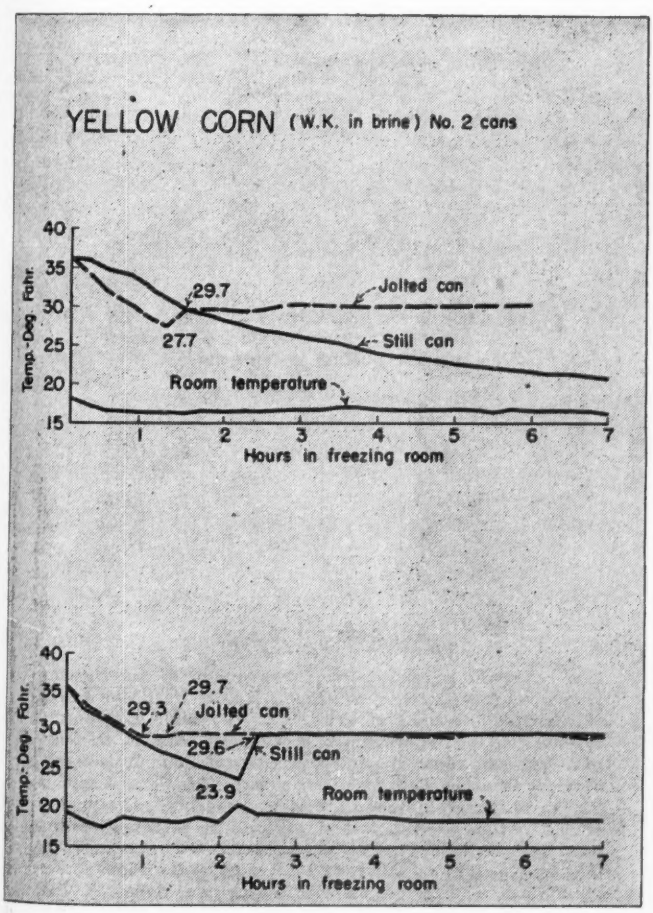
Yellow Corn (W.K. Vac. Pack)

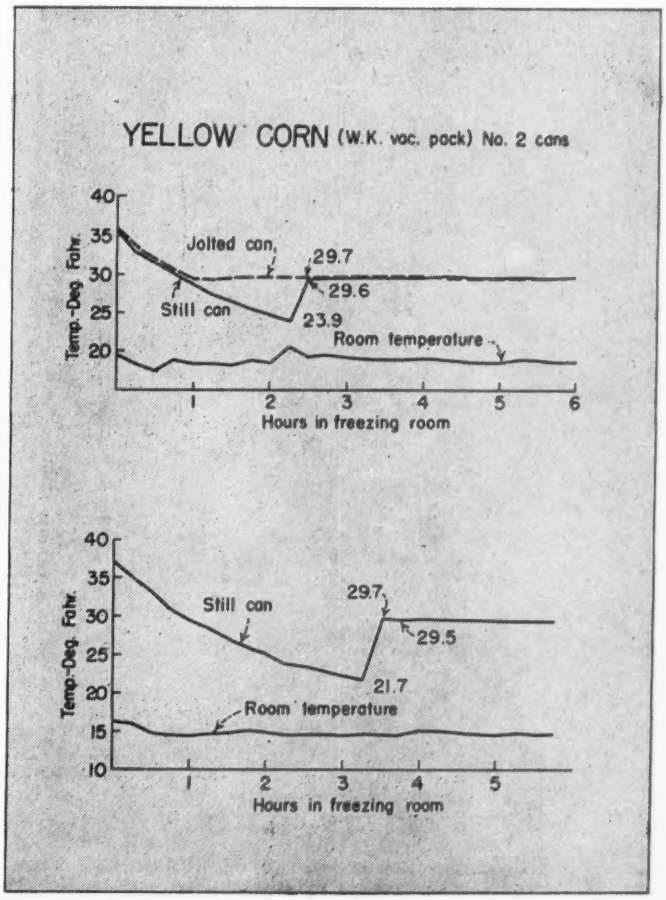
Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	17.5-19.4	35.5	¾	1¾	5.7	2½	29.6
1—Jolted .	17.5-19.4	35.8	1	½	0.4	1½	29.7
2—Still ...	14.5-16.3	37.2	1	2½	7.8	3½	29.7

Freezing point range,. 29.6°F. to 29.7°F.; average, 29.7°F.

Inspection immediately after each test showed the contents frozen hard.

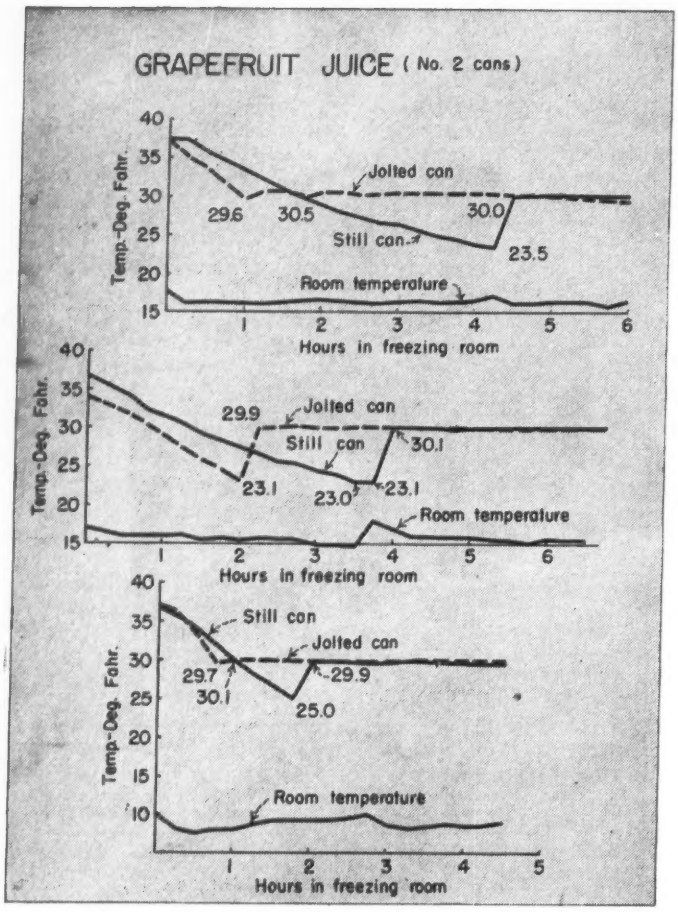






Freezing Point Data Sheets

PART III—Cont.



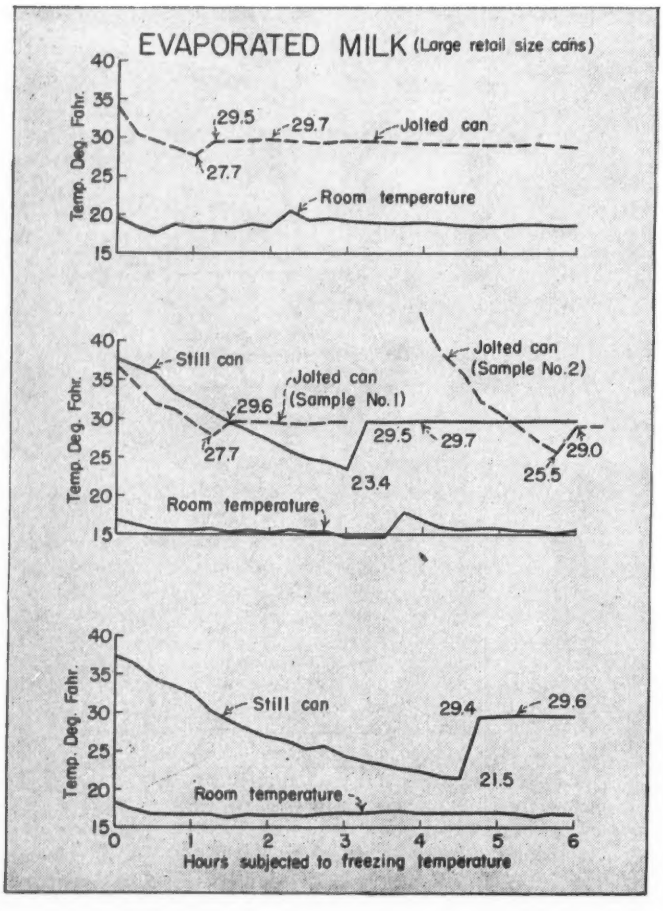
Grapefruit Juice

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2 size cans:							
1—Still ...	14.7-16.9	36.5	1¼	2¾	7.0	4	30.2
1—Jolted .	15.4-16.9	34.0	¾	1½	6.8	2¼	30.2
2—Still ...	7.7-10.1	36.8	1	1	4.9	2	30.0
2—Jolted .	7.7-10.1	37.2	¾	¼	0.3	1	30.2
3—Still ...	16.0-17.1	37.3	1½	3	6.5	4½	30.0
3—Jolted .	16.0-16.2	37.0	1	¼	0.9	1¼	30.5

Freezing point range, 30.0°F. to 30.2°F.; average, 30.2°F.

Inspection made immediately after each test showed the contents frozen to a depth of ½ to ¾ in. around the sides of the can, with a thick slush in the center.

Hard freezing showed no effect.



Evaporated Milk

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
Large retail size cans:							
1—Still ...	16.3-18.3	37.3	1½	3¼	7.9	4¾	29.4
2—Still ...	14.7-15.9	37.4	1½	1¾	6.1	3¼	29.5
2—Jolted .	14.7-15.9	36.9	1	½	1.9	1½	29.6
3—Jolted .	17.5-20.5	34.0	½	¾	1.8	1¼	29.7

Freezing point range, 29.0°F. to 29.7°F.; average, 29.4°F.

Inspection made immediately after each test showed the contents thick with the formation of ice crystals, but not frozen solid.

Hard freezing showed no effect.

Acknowledgments

This research, an exhaustive investigation of the freezing of canned goods, was conducted by D. H. Rose, senior physiologist, Division of Fruit and Vegetable Crops and Diseases, U. S. Department of Agriculture, and H. D. Johnson, transportation specialist, Transportation, Rates and Services Division, Office of Distribution, War Food Administration, M. N. Weatherhead, assistant mechanical engineer of the Fruit Growers Express Company, assisted the government officials in the investigation, which was conducted at the experimental cold storage laboratory of the Plant Industry Station, U. S. Department of Agriculture, Beltsville, Md.

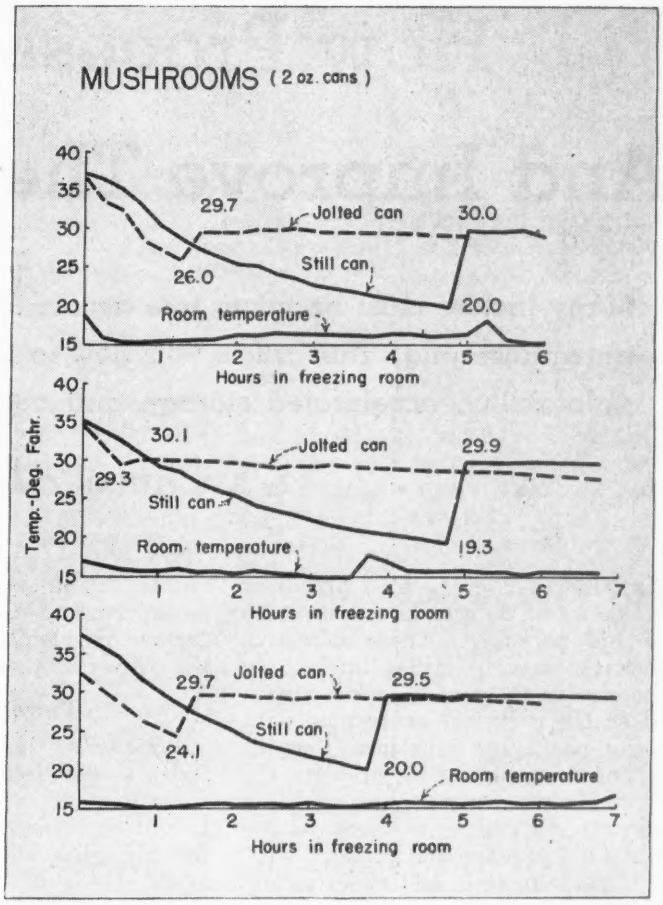
Mushrooms

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
2 oz. cans:							
1—Still ...	14.9-15.9	37.4	1	3	9.5	4	29.5
1—Jolted .	14.9-15.9	32.4	½	1	5.6	1½	29.7
2—Still ...	14.7-17.9	35.3	1	4	10.6	5	29.9
2—Jolted .	14.7-17.9	34.7	½	¼	0.8	¾	30.1
3—Still ...	15.3-19.0	37.2	1	4	10.0	5	30.0
3—Jolted .	15.3-19.0	36.8	¾	¾	3.7	1½	29.7

Freezing point range, 29.5°F. to 30.1°F.; average, 29.8°F.

Inspection made immediately after each test showed the contents frozen hard throughout the can.

Hard frozen sample slightly darker in color than the unfrozen sample. Flavor and texture unaffected.

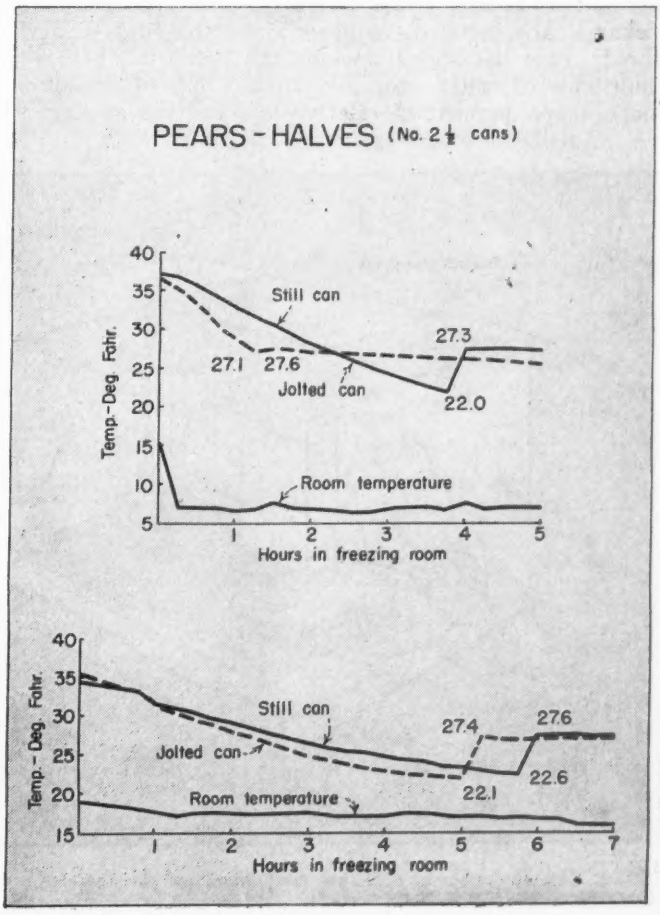


Pears (Halves)

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Undercooling (hr.)	Undercooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2½ size cans:							
1—Still ...	15.9-18.5	34.7	2¾	3¼	5.0	6	27.6
1—Jolted .	15.9-18.5	35.6	2¼	3	5.3	5¼	27.1
2—Still ...	6.4- 7.7	37.3	2¼	1¾	5.3	4	27.3
2—Jolted .	6.4- 7.7	36.5	1¼	¼	0.5	1½	27.6

Freezing point range, 27.1°F. to 27.6°F.; average, 27.4°F.

Inspections made immediately after the tests showed a heavy slush throughout the can.



Hard Frozen Samples

The inspection of hard frozen samples was made by the Processed Products Standardization and Inspection Division, Fruit and Vegetable Branch, U. S. Department of Agriculture.

Undercooling—Other Commodities

These data sheets show the extent of undercooling with canned and bottled goods, the freezing points, and the effect of freezing. Part I was published in the April issue of Food Industries. Part II appeared in June. Data on other commodities will be presented in future issues.

How Processors Can Test And Improve Their Own Packages

Many factors must be taken into account in determining the efficiency of proposed new packaging. This article tells how to measure package performance. Chemical, palatability, accelerated storage and consumer acceptance tests will be required

By A. L. PITMAN, Consultant, Manhasset, N. Y.

PROBABLY every food processor knows of defects in one or more of his packages. These defective packages may be either inferior or superior to those of his competitors. Often the packer is confronted with major packaging problems. Regardless of the nature of the problem, the food manufacturer should initiate his own packaging research to improve his package and product.

If package tests and experimental packs are under consideration, prepare a list of severe conditions as well as normal ones under which the packages are handled, shipped and stored. This list should include the conditions of shelf storage: time, temperature, percent of relative humidity and unusual conditions, such as exposure to the sun's rays. These factors frequently can be offset by the proper method of packaging.

Frozen Foods

Relatively high moisture-vapor losses from frozen foods are to blame for freezer burn of poultry and for toughness of vegetables. Better package materials and methods are indicated.[1] Air flows into and out of packages due to barometric and temperature changes unless they are hermetically sealed. Such action causes the food to dry out. Desiccation in this manner is supplemental to the loss of moisture through the walls of the package.

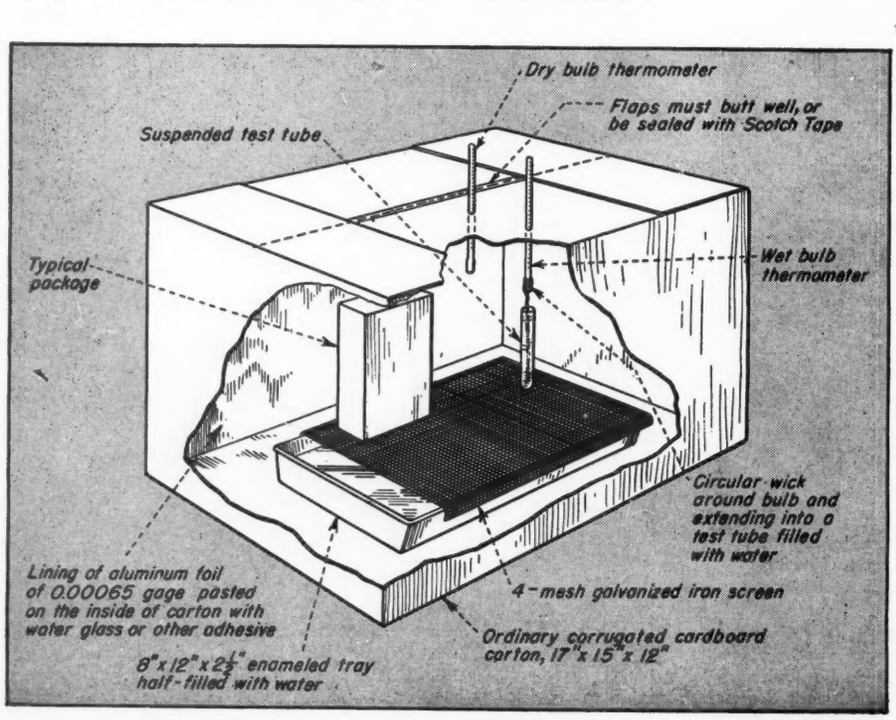

Dry bulb thermometer
Flaps must butt well, or be sealed with Scotch Tape
Suspended test tube
Typical package
Wet bulb thermometer
Circular wick around bulb and extending into a test tube filled with water
Lining of aluminum foil of 0.00065 gage pasted on the inside of carton with water glass or other adhesive
4-mesh galvanized iron screen
Ordinary corrugated cardboard carton, 17" x 15" x 12"
8" x 12" x 2½" enameled tray half-filled with water

FIG. 1. Cutaway view of a simple, high humidity chamber for use inside a large thermostatically controlled oven.

More attention should be paid to the oxygen content of frozen food packages, particularly for precooked foods. If tests are to be conducted by reducing the oxygen content, the processor must avoid introducing a health hazard, since anaerobic bacteria might be encouraged to grow in foodstuffs packed with a low oxygen content.

Dehydrated Foods

Most dehydrated foods are finished and sold at moisture levels that correspond to the equilibrium of those foods in rather dry air. Some products with a moisture content at equilibrium with relatively high humidities require only a moderate amount of moisture-vapor protection. Others are notoriously difficult to package and necessitate extreme protection against moisture gain. Dried prunes, however, with three percent added moisture are packaged to hold the moisture under most conditions encountered in stores. A number of articles have described the packaging requirements for dehydrated vegetables, one of which was that of Pitman, Rabak and Yee.[2] Flexible packages that are filled with nitrogen and hermetically sealed would frequently be beneficial, although such packaging methods have apparently not yet been commercialized.

Graebner[3] has introduced the term "point of failure" in his discussion of moisture content in relation to packaging. The point at which failure occurs may be indicated by visual changes such as caking of powders, loss of crispness of prepared cereals, or by chemical changes causing degradation in quality, which are more involved. These are often accelerated by an increase in moisture

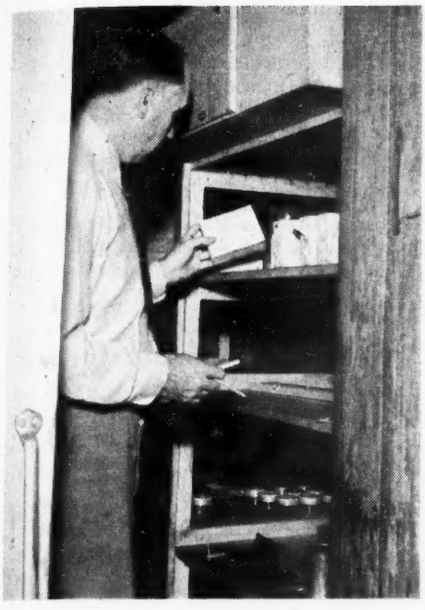


FIG. 2. Interior of storage chamber for package and storage tests at Western Research Laboratory, Bureau of Agricultural and Industrial Chemistry, U. S. Dept. of Agriculture. Chamber operates at approximately 90 deg. F. and 90 percent R.H.

content brought about by improper packaging. Authorities on dried skim milk place the maximum allowable moisture content of it at four percent, a limit which Graebner uses as the "point of failure" with respect to moisture content.

Fresh Fruits and Vegetables

Prepackaged fruits and vegetables are now receiving much attention. Washed spinach in cellophane bags and tomatoes in cartons with cellophane windows are now commonly displayed in groceries. Prepackaging of these items has been growing because it cuts losses from mold; lessens shrinkage due to wilting; reduces retailing expense and prolongs salable life. Frequently the vitamin C content is better retained by prepackaging. Temperature will probably be important to about the same degree that it is when that particular fruit or vegetable is shipped in crates or baskets than unpacked onto counters. The sugar in fresh fruits and vegetables is slowly converted to carbon dioxide and water. This change, accompanied by the absorption of oxygen, produces heat. An increase in the concentration of carbon dioxide in the atmosphere around apples, with the accompanying diminution of oxygen, slows down this reaction and lengthens the life of the fruit. The change in composition of the atmosphere is detrimental if the carbon dioxide exceeds certain limits differing with the variety.

Pliofilm, a rubber hydrochloride film, has been tested on a variety of vegetables. They were marketable from two to ten times longer than when not so protected.[4] When developing other packages of this type, consider the permeability of the packaging material to carbon dioxide and to water vapor; the overall effect of a complete package on these properties and on mold growth; loss in weight and reduction in trimming loss.

Testing Package Performance

What are some of the practical methods by which important elements in packaging may be measured or controlled?

Temperature - and - humidity - controlled cabinets are very desirable. A 20 deg. F. rise in temperature may increase spoilage rates for two- to four-fold. Relative humidity is important. Rates of moisture loss or gain from a package depend on the difference in the moisture contents of air outside and inside the package. Cabinets with controlled humidity and temperature can be quite inexpensive if they are of small size and do not require a constant supply of fresh air. For example, a low temperature cabinet was improvised from a bacterial incubator, fitted with a foil-lined carton. A simple, high humidity chamber is shown in Fig. 1. Wet and dry bulb thermometers were brought through the lid of the carton. A large tray, filled with water, maintained the contents at 85 to 95 percent relative humidity for long periods of time. The temperature was 100 deg. F. Charles Southwicke, Jr., developed a small, cylindrical cabinet for General Foods, which is now commercially produced and quite widely used. It maintains the test conditions somewhat more accurately than the improvised cabinet. Air in the General Foods cabinet is slowly circulated by a fan. Low known relative humidities may be produced in inclosed spaces by exposing layers of appropriate salts in the inclosed air space.[5]

FIG. 3. Cellophane-wrapped head lettuce keeps two to four times longer.

Walk-in types of cabinets are desirable if the demand is sufficient to justify the size and expense. Storage tests of packages require continual maintenance of conditions. On the other hand, tests for brittleness of coatings, low-temperature drop tests and freezing speed measurements can often be made in a cabinet cooled by solid carbon dioxide for the period of the test.

A simple method for detecting the difference in tightness of two packages to penetration by a volatile flavor, such as garlic cloves, consists in placing each package in a friction-top can and allowing the cans to remain 24 hours before opening. The tightest package will impart the least odor to the air in the can.

Humidity and Temperature

When a product, such as macaroni, is sold to a store located in a hot, humid climate, there will be a difference between the moisture content of the air surrounding the macaroni in the package and the moisture content of the air outside the package. That difference acts to drive moisture through the package and into the macaroni. The conditions of the out-

FIG. 4. Flat, envelope-type package for dehydrated foods offers protection against caking or lumping.

TABLE 1—Standard Form for Palatability. Test Material—Reconstituted Dehydrated Cabbage

Code No.*	Sample**	Aroma	Flavor	General Palatability
A	....	2	3	3
B	....	3	3	3
C	....	4	4	5
D	....	4	5	5
E	....	2	2	3
F	....	3	4	4

Aroma	Flavor	General Palatability
1. Excellent	1. Excellent	1. Excellent
2. Good	2. Good	2. Good
3. Fair	3. Fair	3. Fair
4. Faint or none; not objectionable	4. Faint or no flavor; not objectionable	4. Passable
5. Objectionable	5. Objectionable	5. Objectionable

Run No. 3 Date: June 5, 1946
Signature: John Smith

*Code No. A, B and E represent the first sample. C, D and F represent the second sample.
**Identified after conclusion of test.

side air can be determined directly from wet and dry bulb readings, or they can be estimated from air-conditioning tables.[6]

Foodstuffs with different moisture contents are in equilibrium with the relative humidity of the air inside the package. This relationship is known for many substances, including wheat flour.[7] In general, it is quite likely that the relation between relative humidity and moisture content of mixes can be computed with a fair degree of accuracy if the property is known for the various components. Moisture-vapor transfer rates of sheet materials are made by following tentative methods of the American Society for Testing Materials.[8,9] Manufacturers of the materials can frequently supply this data. The moisture-vapor transfer rates of packages can be determined by using a General Foods or other test cabinet. The rate of gain in weight of the package is measured by using calcium chloride as the contents of the package. Free and definite circulation of the air about the packages is essential for consistent results. The methods used for applying the foregoing to a specific problem in moisture absorption by a package are given in detail by Pitman, Rabak and Yee.[2]

Measuring Palatability

In general, tests for palatability represent the sum of a taster's impression, which include color, aroma, flavor and texture. Individuals test samples blindfolded and with blindfolds removed. A sample form for testing aroma, flavor and general palatability is shown in Table I. The form contains six rows for scoring two samples of food. Each sample is tested three times under different code numbers. When sampling for aroma and flavor, tasters are blindfolded. When sampling for aroma, only odors are noted. Judgment of flavor includes both odor as normally observed in the mouth and any sensations of sweetness or other flavors. An evaluation of general palatability is made with blindfolds removed and covers a composite scoring of the foods' flavor, aroma, color and texture. Scorers enter appropriate ratings for aroma, flavor and general palatability as they progress through the panel test. At the conclusion of the test, dietitians identify the samples and prepare other sheets with the average results.

Two trends in flavor measurement can be noted. The first is toward the use of code-marked samples to prevent bias in taste tests. Tasters are tried out on a foodstuff with samples varying widely in flavor, but indistinguishable to the eye. Those who can most consistently classify these flavors are selected for the taste panel.[10]

The other trend is toward the use of chemical analysis. Samples are analyzed quantitatively for components entering into the flavor, both good and bad. For example, the flavor of dehydrated onions correlates closely with the sulfur content, since the flavor of onions is due to organic sulfides. Food products with high fat content are analyzed for peroxide values and free fatty acid contents; both components indicate if the product is rancid and, if so, to what extent.

FIG. 5. Wrapping in Mil-O-Seal stops costly shrinkage of cooked hams and meat loaves.

Colors are recorded by the Munsell system, which has three dimensions: hue, value and chroma. An instrument is used for the measurements. Charts may also be used, but instrumental methods of comparison are more accurate. Another well-known system, and one which is used in a number of food specifications, is that of Maerz and Paull.

Planning Experimental Packs

Testing is not complete unless an experimental pack is made. Plan the pack in such a manner that it will provide facts that your toughest customer would concede to be certain. Consider his attitude to be: "It can't be done." Plan the pack so that the data will yield clear-cut differences between the results in your standard package and the new ones under trial.

Pick areas from which complaints due to packaging have been most frequent. Plan to use similar temperatures, relative humidities and shelf-life as one set of conditions in the comparative storage tests. Where specifications have been set up for the foodstuff, select those specifications most liable to fail during storage and see that corresponding tests are made on the contents of packages as they come from the storage runs. Always include tasting tests, whether they are part of the specifications or not. Much can be learned by carrying on storage tests at more than one temperature or humidity. It is well to have one set of samples run at reasonable temperatures and humidities, and one at a definitely accelerated set of conditions, as well as the set which is run under the known, adverse, practical conditions already planned above.

If the results from the accelerated tests are definitely encouraging, it will be time to arrange for actual consumer tests. Opinions may be asked on half a dozen points related to the quality of the product, appearance and ease of use of the package. Country-wide sampling is usually done by agencies but is also carried out by large food corporations. Several hundred people, usually customers, compose such panels. Some home economists ask which package is preferred, and why. This gives the samplers plenty of latitude to express their opinions, which are classified and serve as guides to any needed improvements. Other economists employ forms with detailed questions. Only by thorough sam-

(*Turn to page* 228)

EDITORIALS

LAURENCE V. BURTON, Editor

OPA Causing Unemployment

THE famine emergency does not cause all the shut downs of food plants because of diversions of raw materials to overseas destinations. OPA can share that honor. Here are a few facts.

At Dixon, Illinois, there is a cheese plant that shut down in mid-May, throwing 125 workers out of their jobs. The OPA ceiling for that plant was 27 cents a pound, but it takes 31 cents to break even.

A Minnesota butter manufacturer has closed down production in two plants because the ceiling is 46 cents on butter, but butterfat in the form of fluid cream commands from 75 to 90 cents a pound. The wholesale price in nearby Wisconsin ranges from 78 cents to 86 cents. He just cannot compete. The plants are down and the men are out of work.

Inept price controls not only make for scarcities but for unemployment.

Spending Depreciation Reserves

DEPRECIATION reserve—reserve for depreciation—call it what you will, has a mysterious sound. It is nothing more than a deduction from income to cover the loss of buildings and equipment from wear and tear, or depreciation.

What becomes of this reserve is, however, the great indoor mystery of top management. Sometimes the money is credited to earned surplus and later may somehow even find its way back to the shareholders. Or it may be kept in the business as an addition to working capital. Neither procedure is economically sound.

Depreciation reserves are there to be spent for replacement of the thing depreciated. But directors do not always follow this rule. During the big depression the reserves were only a bookkeeping figure. The money was gone—down the rat hole, mostly—and many a firm was unable to buy any equipment at a time when it was dirt cheap. Also it was at a time when money spent for capital goods would have gone a long way to alleviating unemployment.

In 1946 when money is fairly plentiful the reserves are in the bank, ready for spending. But, though directors are willing to spend, the deliveries of needed equipment are woefully slow. Equipment builders are complaining that buyers want everything they can get today. Yet, at some future date, when orders are urgently needed, the buyers can be expected to refuse to spend their depreciation reserves.

One equipment builder has said that if all industrial concerns would develop sound future plans and spend their depreciation reserves in accordance with a planned schedule, it would do much to avoid the ups and downs of business. It would avoid overbuilding of the equipment industry in a boom-time like the present, to be followed by languishing business in lean times.

A consistent replacement policy based on logical schedule of expenditures is a policy of decided merit. It will avoid the feasts and famines that cause so much economic woe.

In Retrospect

IF it is true that the American people will not work until they are out of money and hungry, they are taking the proper course to remedy the causes of reduced production. Though Congress refuses to correct the inequities of the Wagner Act, it is possible for the states to do something for themselves. Those states that give unemployment benefits to strikers could repeal that form of temptation.

Between the perplexities brought about by the rail strike, the coal strikers, other industrial disputes, plant shut downs due to scarcity of parts of raw materials, the famine overseas, the veto of the Case Bill, the grudging price increases granted by OPA to keep firms out of the red, and the Supreme Court feud,May and June, 1946, have been a pair of months that few will remember with satisfaction.

Diagnosing OPA Ills

WHETHER you approve or disapprove of the economic beliefs of specialists at the College of Agriculture, Cornell University, the analysis of "OPA Economics and Politics," by Frank A. Pearson and Don Paarlberg is extremely important. Its convincing arguments run like this:

* * *

Under a free economy, prices perform three functions—ration consumption, control production and guide products through the channels of trade. These functions of price cannot be repealed by law. Those who would fix prices usually concern themselves with only one of the three functions of price and ignore the other two.

When prices are fixed, the guiding of production and regulation must be undertaken by other means since free prices are prevented from doing the job. The first activity in a control program usually is to announce low ceiling prices. These low prices stimulate consumption. With goods disappearing at an increased rate, it becomes necessary to ration the dwindling supply.

Under low ceiling prices, however, production declines because the price incentive is lacking. This

sets the stage for the third act in the national melodrama—subsidies to keep up production.

The public knows that a three-legged stool can't stand on one or two legs, but the public does not understand that OPA is a three-legged stool. The public does not understand that price fixing, rationing and subsidies are necessary to support the price control program.

* * *

There you have a complete diagnosis of the cause of most of our current shortage problems. The entire document is even more interesting and deserves everybody's study.

Increasing Uses of Carbohydrates

IT APPEARS quite plausible and possible that three significant developments can be expected in the postwar years. Sugar, either dextrose or sucrose, will be an important raw material for production of chemicals, thus contributing the much sought nonfood uses of sugars. Starch, after years of intensive study, is now also on the way to be a raw material for production of chemicals. And cellulose, sawdust, or straw seems likely to be a raw material for some chemicals that, like glycerine, have food use.

All this implies chemurgy in a big way in the postwar future, with all the hoped-for benefits to agriculture. More importantly, however, it means that firms in the carbohydrate food field must sooner or later get into the chemical business as soon as any food firm shows that this sideline is notably profitable.

It will be difficult for competition to trace the successful firm's source of profit from byproducts of a chemical nature. And it may be still more difficult for the competition to understand price setups on food products when the chemical byproducts prove to be really lucrative.

The food processing industry is likely to grow more and more complex, rather than become more simple, and its business and technical direction will require commensurate abilities.

New Thermolabile Food Factor

DAIRY TECHNOLOGISTS have something new to ponder in the nutritional discoveries of Dr. Rosalind Wulzen at Oregon State College. As reported by Dr. C. Glen King, scientific director of the nutrition foundation, to the New York Section of Institute of Food Technologists on May 16, she has discovered in raw milk a new food factor (possibly another vitamin) entirely independent of known B factors.

It is easily destroyed by heat above 146-147 deg. F. Guinea pigs on a high calcium diet, but lacking this new factor, show arterial deposits of calcareous material, unorganized deposits of calcium salts in soft tissues and leg bones and stiffness of the joints. A low magnesium intake aggravates the condition.

It is further known that the new factor is associated with the cream rather than the non-fat milk solids.

This deficiency result is of obvious interest in its relation to the possible causes of arthritis in humans. And, pharmaceutical houses are understood to be actively seeking to isolate, identify and synthesize the new food factor.

This discovery leads at once to interesting speculation. Is the new factor the same as the substance responsible for the rising of cream, discovered years ago at Cornell by Dr. Paul F. Sharp? His substance is also easily destroyed by heat at about 146 to 147 deg. F., which explains the loss of the cream line by overpasteurization.

Will the existence of the new factor be seized upon by uninformed faddists as the basis for an attack on milk pasteurization regardless of its prevention of transmission of undulant fever, septic sore throat and other infections known to be transmitted by raw milk?

If the factor can be synthesized, will the public health authorities permit it to be restored to pasteurized milk? Or, is this likely to be one more pill to be sold over the radio—one a day to prevent rheumatism?

Dr. Wulzen's new food factor may introduce many new problems of processing in the dairy field, and it may stimulate further consumption of other unprocessed foods.

Merge for More Employment

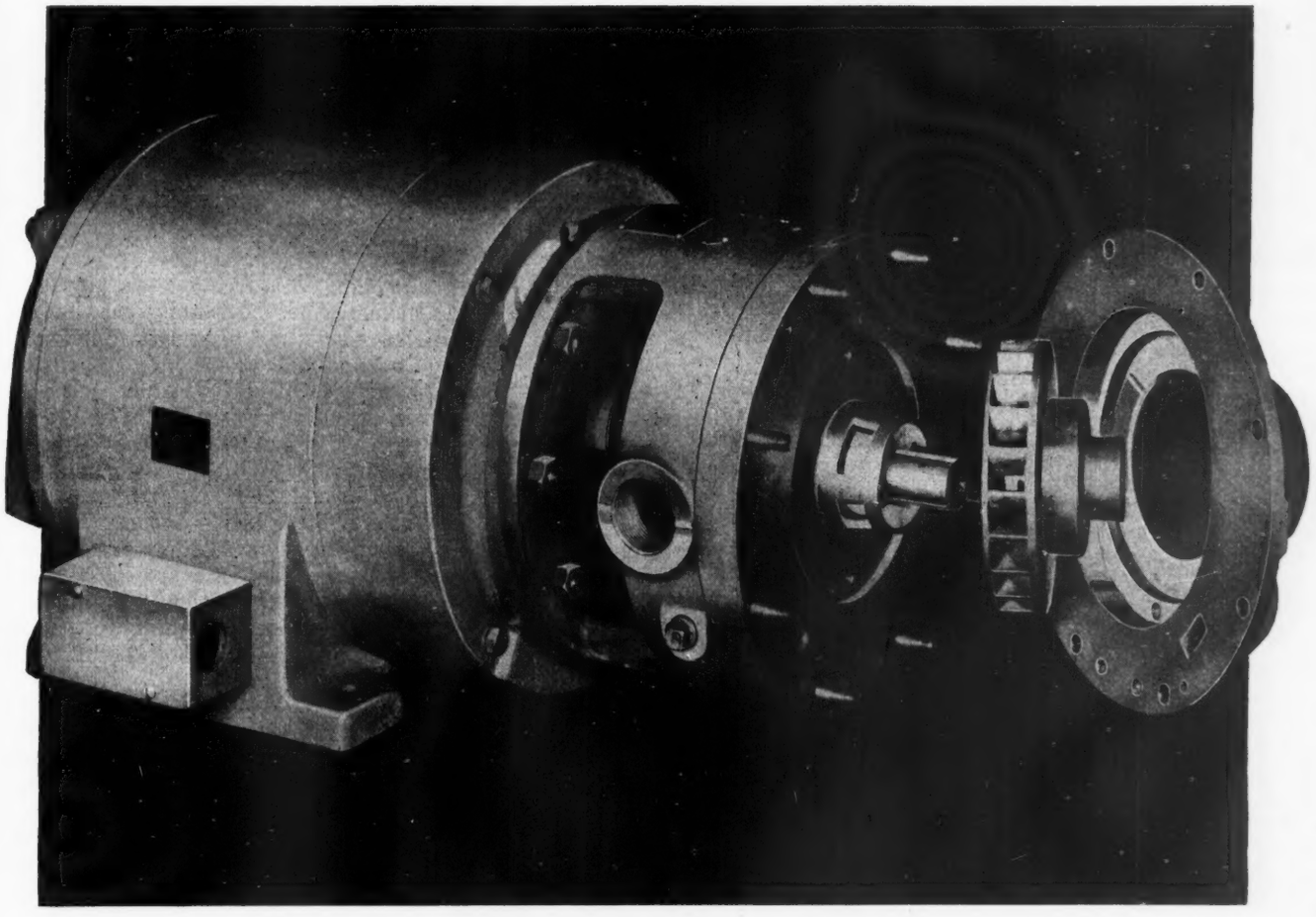
AN interesting forthcoming merger of two plants of General Foods Corporation will be followed with great interest. For, if it works out according to plan, it would appear that the same pattern could be applied to other seasonal businesses in the food processing industry.

All the production of Certo (liquid pectin) is to be moved from the old plant of the former Douglas Pectin Company at Fairport, New York, to the greatly enlarged and modernized Birdseye-Snyder plant at Albion, New York. Several factors contributed to the decision, but one important aim is to reduce seasonal employment. Both the Fairport and Albion plants operate on seasonal crops, the former on fall apples, the latter on vegetables.

By combining the two operations, the operating period can be greatly extended over the year, which means regular employment and fewer seasonal workers.

Should the effort meet all expectations it will afford an example that other concerns may want to emulate, especially in view of labor's growing insistence on the annual wage. Independent companies having complementary production periods could profitably seek each other out for the obvious mutual benefit to be derived from such joining of forces.

The Nash Clean-Air Compressor has but one simple moving part.



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

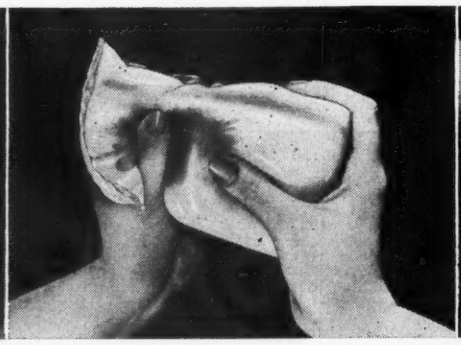
Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

THE NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS



Boon to Housewives

THE chore of coloring margarine has been lessened by the invention of a bag made of a thermoplastic film that is said to be non-toxic and stable in the presence of fatty acids and brine.

The margarine is hermetically sealed in the bag along with a capsule of vegetable coloring. When the package is squeezed, the coloring substance is released and a few minutes of kneading give the margarine its desired hue.

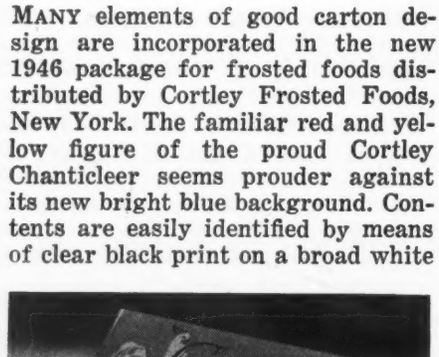
The idea was developed and patented by Leo Peters of the Lion Rock Corp. The Visking Corp., Chicago, produces the film.

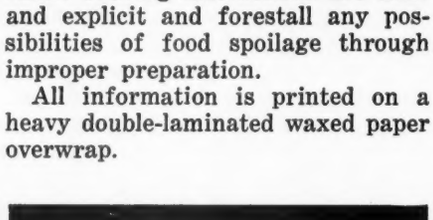
The new method is used by The Cudahy Packing Co., Kansas City, Kans., for its Delrich oleomargarine. The company's "E-Z Color Pak" is protected by a wax-coated folding carton attractively designed in yellow, blue and red.

Restyled

MANY elements of good carton design are incorporated in the new 1946 package for frosted foods distributed by Cortley Frosted Foods, New York. The familiar red and yellow figure of the proud Cortley Chanticleer seems prouder against its new bright blue background. Contents are easily identified by means of clear black print on a broad white band across the face, while on the back are menu suggestions and a note on the caloric value of the contents. Cooking instructions are clear and explicit and forestall any possibilities of food spoilage through improper preparation.

All information is printed on a heavy double-laminated waxed paper overwrap.





Deep Frying Simplified

A NEW batter mix used in the past year by hotels and restaurants is now being packaged and distributed in retail containers.

Dep-Fri consists of bleached wheat flour, baking powder, salt, imitation white pepper, powdered egg, powdered skim milk, and certified food color. When mixed with equal parts of water, the batter is suitable for deep frying sea food, meats and vegetables.

The red, blue and yellow paper-covered carton carries complete directions and recipes for use. Net weight is 10 oz. and the manufacturer is Palmer House Food Products Co., Miami, Fla.

Now Dry Molasses

DEVELOPMENT of a new powdered molasses has been announced by the new foods and processes division of Commodity Brokers Inc., 141 Broadway, New York. The new product, being more resistant to caking, is easier to handle and has broader application in dry mixes and other food products. It is light in color, lacks a bitter taste and can be used as new dry sweetener in desserts, ice cream, confections, prepared dry mixes and starch-type puddings.

The new dry sweetener is packed in trial tins of about 5-and 30-lb.

Frozen Pineapple

ONE of the latest items to join the ever increasing list of quick frozen foods may be credited to Pan-Am Freezers, Ltd., Brownsville, Tex.

Pineapple Tidbits, in 60° Brix sirup, are packed in 1-lb. consumer packages under the Four Winds brand name.

The product is protected by a wax-coated pouch and wax-coated carton, attractively designed in bright yellow, blue and white.

For the past year the company has been quick freezing grated coconut imported from Mexico. It is packaged in the same manner as the pineapple, in 8-oz., 3½-lb. and 11-lb. sizes.

Electronics for Prunes

CLARA-VAL Packing Co., Morgan Hill, Calif., is packaging Clara-Val prunes processed by means of electronics.

Instead of the customary application of external heat, the prunes are packaged and then passed through a high frequency dielectric field for the necessary length of time.

A standard-type carton with pasted paper overwrap is used. Yellow and red printing stands out boldly against a royal blue background. The brand name and product designation appear on each end as well as on all sides of the package.

The company states that it is unnecessary to soak the prunes but they should be boiled from 5 to 15 minutes. Recipes for breakfast prunes, stuffed prunes and prune nut bars are given on the carton. Net weight is 1 lb.

Frozen Chicken a la King

COLLEGE INN FOOD PRODUCTS CO., Chicago, Ill., has produced a quick frozen, precooked chicken a la king that is making its appearance on the frozen food market.

Ingredients include chicken meat and fat, mushrooms and peppers in a sauce containing chicken broth, milk, flour, cream, salt, spices and flavoring. Preparing the precooked product requires only heating the contents of the package in a double boiler.

The frozen meal is packed under the familiar College Inn Brand in a knocked-down style carton. The carton is wax-coated, top-opened and sealed at both ends by an interlocking of top and bottom side flaps. The carton has no inner liner or inner pouch. Overwrapping the carton is a cellophane wrapper that is heat-sealed to both ends of the carton. All information on the product ingredients and directions for serving and keeping are printed on the cellophane overwrap.

Red, white and black colors are used on a background of yellow. Net weight is 12 oz.

Flexible Raisin Pack

VAGIN Packing Co., Fresno, Calif., is packing its Plump and Meaty Brand raisins in Pliofilm-lined "Flav-o-Tainers." This marks the first time that a dried fruit product goes to market in the new, air-tight, heat-sealable package. "Flav-o-Tainers," developed by Thomas M. Royal of Philadelphia, Pa., offer protection against moisture loss, moisture pick-up and insect infestation. Adaptability of this Pliofilm-lined bag for other dried fruits has been shown by tests already completed.

Color motif is red, white and black on a yellow background for the upper two-thirds of the package, and white, black and yellow on a red background for the lower third. On the side of the bag instructions are given on obtaining a recipe booklet. Net weight is 2 lb.

Good Packaging

A PACKAGE aimed at consumer eye-appeal has been chosen by Consolidated Biscuit Co., Chicago, for its new Crackin' Good Sandwich Cookies.

The Peters lock-type carton is made by Gardner-Richardson and has an inner lining of amber glassine and a transparent overwrap.

Starting at the bottom with a bright red background, the color shades off gradually until it becomes pure white. Printing is in brown and white. The package is designed for vertical display but opens horizontally.

The cookies—both vanilla and chocolate—are stamped with brand name and fleur de lis. Net weight is 11 oz.

Millions of people in Europe and Asia will die of starvation unless we help by sharing our abundance now! You can help save them by giving to the Emergency Food Collection. Give money or give food canned in tin. Give today that they may live.

WILL YOU GIVE THAT THEY MAY LIVE?

HERE'S WHAT YOU CAN DO!

1. GIVE MONEY TO BUY FOOD.

More food can be obtained for a given amount of money when it is bought centrally and in large quantities. Send money to your local Emergency Food Collection Committee or to Henry A. Wallace, National Chairman, 100 Maiden Lane, N. Y. 7, N. Y.

2. GIVE FOOD IN TIN CANS.

Leave at any Emergency Food Collection depot.

Urge your church, club, or organization to participate!

Why food must be in tin cans. Food in tin cans can be handled safely for distant shipments and travel over difficult roads.

There is a long, tough, important journey ahead of these Crown cans—they are going to help feed the starving. These cans will stand up to the task assigned . . . affording maximum protection to the food entrusted to them—for like all Crown cans they are of the highest quality.

Maximum protection for *your* product is not the only thing you get when you use Crown cans . . . you also get "personalized service"—the sincere, useful interest in your packaging problems—the "headquarters interest" and help from Crown officials, sales representatives and field service men that Crown customers find exceptionally profitable.

CROWN CAN

THE NATION'S THIRD LARGE SOURCE OF SUPPLY

CROWN CAN COMPANY • PHILADELPHIA • Baltimore • Chicago • St. Louis • Houston • Orlando • Fort Wayne • Nebraska City

FOOD INDUSTRY NEWS

GENERAL

World Food Problems Tackled At FAO Meeting in Washington

Advisory organization, representing 22 governments and 6 international groups, reaches agreement on four major points

REPRESENTATIVES of 22 governments and 6 international organizations meeting in Washington, at the call of Sir John Orr, director-general of the Food and Agricultural Organization, unanimously agreed on four points regarding the present urgent world food situation and world food policy. This meeting was held May 20 to 27 under the auspices of the FAO.

As officially summarized, it was agreed:

"1. The present Combined Food Board (a temporary war-created organization representing the United States, the United Kingdom, and Canada) should without delay be replaced with a much more broadly representative body, the International Emergency Food Council, which shall continue for the duration of the shortage of basic foodstuffs. FAO and the United Nations Rehabilitation and Relief Administration were directed to work closely with the new organization and to participate in its work.

"2. All practicable steps should be taken to make the most effective use of food produced during the 1946-47 year and to help bring about the maximum production of urgently needed foods in that year that will follow. To these ends the conference approved specific recommendations for the guidance of governments and international organizations in encouraging conservation and expansion of food supplies, and in formulating policies of food allocation and distribution.

"3. The FAO should immediately organize a research and information service in the fields of food, agriculture and fisheries. This service, in addition to becoming a continuing function of FAO, would be of particular value to the interim International Emergency Food Council.

"4. The director-general of the FAO should submit to the conference of FAO at its next session, proposals for permanent international machinery to deal with long term problems concerning the production, distribution and consumption of food."

Diversion of grain from livestock to human consumption was believed to be the best means of closing the gap between food supplies and requirements. The committee studying the problems of conservation and expansion of food supplies recommended that no bread grains be fed to livestock. "To make the best use of grain that is fed to livestock, priority was recommended for milk cows and work animals, and maintenance of a nucleus of high quality breeding stock; and it was urged that feeding of other stock, especially pigs and poultry, be reduced to the minimum."

This policy, which tips agricultural operations dangerously out of balance, was recognized as a threat to the future economic stability of the surplus food producing nations and to farm operators. "The committee took note of suggestions that fear of surpluses in years to come might deter some farmers from maximum production in 1947, and recommended that FAO study methods of disposing of agricultural surpluses and the whole problem of securing reasonable and adequate returns to agriculture . . . " It was also recommended, "that UNRRA and FAO cooperate closely in the work of agricultural rehabilitation so that there can be a smooth transition between the short-term program and the long-term objectives of FAO."

Cold Storage Shows Frozen Food Inflation

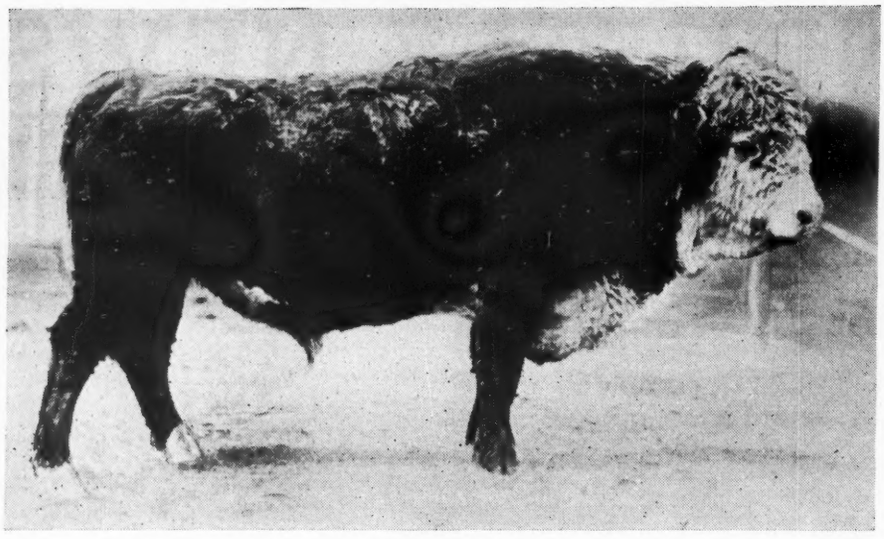
APPREHENSION is felt concerning the way in which some Department of Agriculture officials, as well as many in the industry itself, are overselling the frozen food business. Spokesmen for the industry say that the glowing accounts of profit opportunities in the production and distribution of frozen foods and vegetables are doing the industry a great disservice.

Many people, including any number of returned servicemen, have gone into the business without the

Sunkist Photo

SHIPPING IN SHIPS

The first shipment of oranges and lemons by boat from California to the East Coast was made June 3, when 24,000 boxes started on their way. A later shipment of 50,000 boxes equal to 100 railroad cars was reported by the California Fruit Growers Exchange. The exchange hopes to ship continuously in these refrigerated ships, which travel via the Panama Canal and Havana, at rates about 20 cents per hundred lower than rail shipments.



CATTALO OR BUFFATTLE?

Wanting a breed of cattle that could withstand western Canada's subzero winters and that would face into swirling blizzards instead of turning the hindquarters to the winds, Canadian breeders started experiments more than 25 years ago. They think they have the answer with the offspring of buffalo cows crossed with Aberdeen, Angus, Shorthorn and Hereford stock. But it takes several generations to breed out the sterility of the first issue. Some 75 burly-headed cattalo calves were born this year to help stabilize the breed.

necessary technical knowledge and business experience. They will probably fail because their product will be inferior or because they do not appreciate that the OPA price structure is not normal. For example, the ceiling price of frozen peaches in 30-lb. packages for industrial users is not a true price and, at the moment, is acting as a floor, holding the price between 3 and 4 cents above the actual market value of the product. Newcomers looking at the ceiling price will properly figure that they can manufacture profitably at that figure. But industrial users are not buying peaches at that price because they do not have enough sugar to make preserves and because the price is out of line.

The whole situation is reflected in the cold storage report of May 15, which said, "Freezers are well filled with two or three commodities that are not moving at normal rates, particularly frozen fruits and vegetables." An analysis of the holdings shows that the slow-moving items are fruits packed in 30 lb. packages for industrial use. Another factor is the huge pack of last year. A result is that the rate of withdrawal shows up as lower than normal although on a pound basis withdrawals are above the normal outgo.

At the end of April, there were more than 5,000 carloads of frozen fruits in storage. This is more than the peak of the 5-year average. Industry representatives consider the situation alarming since a year's normal pack remains on hand when a new crop will begin to move into freezer warehouses. A year's storage adds about 3 cents per pound to the cost.

Then, too, a great many newcomers have come into the retail distribution end. There is not sufficient freezing capacity to supply the new outlets with a volume necessary for their survival. In fact, many of the established wholesalers are having difficulty in obtaining products.

Price Rise Limited To Approved Wages

THE decision of the National Wage Stabilization Board in the case of the Detroit creameries states a principle of significance to all food processors. The National Board refused to approve, for price relief purposes, the full amount of wage adjustments agreed to by three Detroit concerns —Brown's Creamery Co., Ira Wilson & Sons Dairy Co., and C. F. Burger Creamery Co. In denying the privilege, NWSB said in effect that wage increases above the approvable limits that may have been granted in related industries do not establish a standard for giving price relief to employers who wish to match the higher wages. Approval of the full amount of such increases would result in "temporary stabilization."

Some months ago, a wage increase of 18 cents was granted to 1,200 employees of the Detroit Milk Dealers Association, which sought NWSB approval for price relief purposes. Only 10 cents of the wage increase was allowed for price relief by the National Board. The dairies had to absorb the additional 8 cents.

The three Detroit creameries in question, two of which deal with other unions, put into effect wage increases of 12½ cents, 18 cents and 15½ cents. When the matter reached NWSB for final decision, only 10 cents was allowed for price purposes. The employers must absorb wage increases above that amount. The majority opinion of the National Board stated that approval of the larger amounts on the grounds offered by the company would nullify the previously set standard of 10 cents and "would deny equality of treatment for comparable cases."

Freezing May Alter Georgia Food Pattern

THE frozen food industry in Georgia took another step forward, May 23, when the $150,000 plant of Southern Frozen Foods, Inc., was opened in Montezuma. Visitors expressed the opinion that the whole agricultural system of Georgia will be revolutionized once the frozen food industry becomes man-sized. They believed that farmers will turn from growing such crops as cotton and peanuts to raising fruits and vegetables and will find a ready market for them at the quick-freeze plants.

Georgia has several large frozen food plants, the largest in Macon, and others are being considered or in the planning stage.

Three men are largely responsible for Southern Frozen Foods, Inc. They are: W. H. McKenzie, Jr., president; J. B. Easterlin, Jr., vice-president, and C. G. Haugabook, secretary-treasurer.

The plant has the latest in modern equipment, which was designed by W. A. Lester, of Cox Foundry and Machinery Co., Atlanta. The principal food to be frozen will be peaches, which will be obtained from south Georgia orchards early in the season, from north Georgia later, and from the Carolinas still later. It is expected that this will keep the plant operating from May through August.

McCormick Moves Bulk Spice Plant to N. Y.

MCCORMICK & CO., INC., manufacturers of food products and insecticides with headquarters in Baltimore, will open a New York manufacturing plant about August 1, according to an announcement of C. P. McCormick, president.

The company has leased the entire building at 481-487 Washington St. in downtown Manhattan, consisting of seven floors and the total of 50,000 sq. ft. to house the new

"Goes on fast -STAYS ON"

That's how one important user describes his labeling with Arabol Icetite Adhesives. Jacobs Brothers and Buehling, of Chicago, are the makers and bottlers of the popular Corona Beverages. Mr. Marion E. Jacobs, President, writes: "Our O. & J. 'single' Labeler runs 140 to 180 cases an hour. We are more than satisfied with the way your Icetite Glue takes hold—and the smooth, clean way it runs. The label goes on fast and stays on—even under long icing conditions. This safeguards the identification of our products and thereby our reputation."

Many leading bottlers endorse Arabol Icetite and Semi-Icetite Adhesives for these qualities. They know their labels will hold when they should hold—yet come off easily in the soaker . . . For any labeling, case-sealing or other adhesives problem, we invite the opportunity to demonstrate our ability to serve you. See the Arabol Representative when he calls. He knows adhesives.

PIONEERING *in the making of* ADHESIVES THAT WORK

THE ARABOL MANUFACTURING CO.

Executive Offices: 110 East 42nd St., New York 17, N. Y. CHICAGO—54th Avenue & 18th Street
SAN FRANCISCO—30 Sterling Street • *Branches in Principal Cities* • *Factories in Brooklyn, Cicero, San Francisco*

Adhesives?... ARABOL!

manufacturing plant and the firm's New York offices.

The regional sales office, under the direction of R. L. Irwin, has already been transferred from its previous location at 100 Hudson St. to the new address at 487 Washington St.

The new plant will process, pack and distribute a full line of whole and ground spices and ground spice mixtures for the food processors and the bulk spice trade. McCormick production of packaged items for the regular retail trade will continue to be manufactured in the headquarters plant in Baltimore. William E. Squires will direct operations at the New York plant.

Five Patent Bills Await Senate Action

FIVE bills, which the National Association of Manufacturers regard as offering constructive changes in the patent system, are now awaiting action by the Senate.

These measures, all of which have passed the House, are the Boykin Patent Priority bill, which extends the time for filing applications for patents where the failure to file was due to war causes; the Henry bill, for simplification of accounting procedure; the Lanham bill correcting inconsistencies in the patent statutes that require proof of inventions by foreign nationals; another Boykin bill for recording of patent agreements; and the Lanham trade-mark bill.

Soviet Plans Include Food Plant Rebuilding

EXPANSION plans for Soviet processors of meat, dairy products and fish under the new five-year-plan were recently outlined by the cabinet ministers involved. Large numbers of new and reconstructed meat and dairy products establishments are called for, as well as a high percentage rise in output of milk products and canned and frozen fish.

The plans for new or reconstructed plants in various branches of the industry are: Meat packing plants, 77; Cold storage plants, 67; Creameries, 70; Milk canneries, 21; Mechanized butter and cheese plants, 1,200; Fish canneries, 13; and Frozen fish warehouses, 30.

Most of the new building of meat and dairy plants will be in the Ukraine and Byelorussia, probably the richest farming sections in the Union and the ones most devastated by the Nazis. According to Pavel Smirnov, Minister of the Meat and Dairy Industry: "Practically all of the herds of cattle in the Soviet areas overrun by the enemy were driven off into Germany or were slaughtered. Hundreds of meat dressing and packing plants, scores of cold storage warehouses, and thousands of creameries and cheese dairies were destroyed by the Nazis."

More Rigid Scrutiny Urged by F&DA Group

NEEDS for strengthening regulations, close scrutiny of food substitutes, and national sanitary programs were major interests at the 50th annual conference of the Association of Food and Drug Officials of the United States, held in Atlanta, Ga., June 3 to 7.

Dr. P. B. Dunbar, commissioner United States Food and Drug Administration, issued a special warning in the case of oils and fats, where mineral oil is used in salad dressings. He declared that this has become so widespread that it constitutes a threat to public health. In the light of newer knowledge of the deleterious effects of continued consumption of mineral oil, he said, the administration has been forced to consider any salad dressing made with mineral oil as adulterated, regardless of labeling.

Concerted action by food and drug officials has led to a nationwide recognition of the need of national sanitation programs to be sponsored by the food industries, Dr. Dunbar declared. He pointed out that 70 to 75 percent of all seizure actions of the administration were based on decomposition or filth. The courts are imposing heavier fines for sanitary violations.

Hermann C. Lythgoe, of the Massachusetts Department of Health, supported the move against use of mineral oils in salad dressings, terming them "intestinal bombs." He said that the use of mineral oil actually may result in vitamin starvation with all the symptoms of the deficiency diseases.

Speaking on quality control in the food industries, Dr. F. C. Blanck, of the H. J. Heinz Co., stressed the need for knowledge of proper varieties of fruits and vegetables for processing and the need in the food industry for field men with knowled of varieties and production methods. Need for adequate storage tests, taste panels, nutritive value tests and constant sanitary practices was emphasized.

The danger of addition of chemicals was cited by Dr. W. B. White, who said that in some cases large numbers of persons had been made ill, had been permanently injured or killed by chemical adulterants in foods. He cited the use of monochloracetic acid. He said officials should discourage the use of chemical preservatives whenever possible because they may in time be shown to have chronic toxicities of definite public health significance.

Taylor Rogers, of the Oklahoma State Health Department, was elected president of the association, succeeding J. C. Schneider of Indianapolis. C. Reynolds Clark, Georgia State chemist, was elected vice-president, and Evan Wright was re-elected secretary-treasurer.

Flavoring Group Sees Continued Scarcities

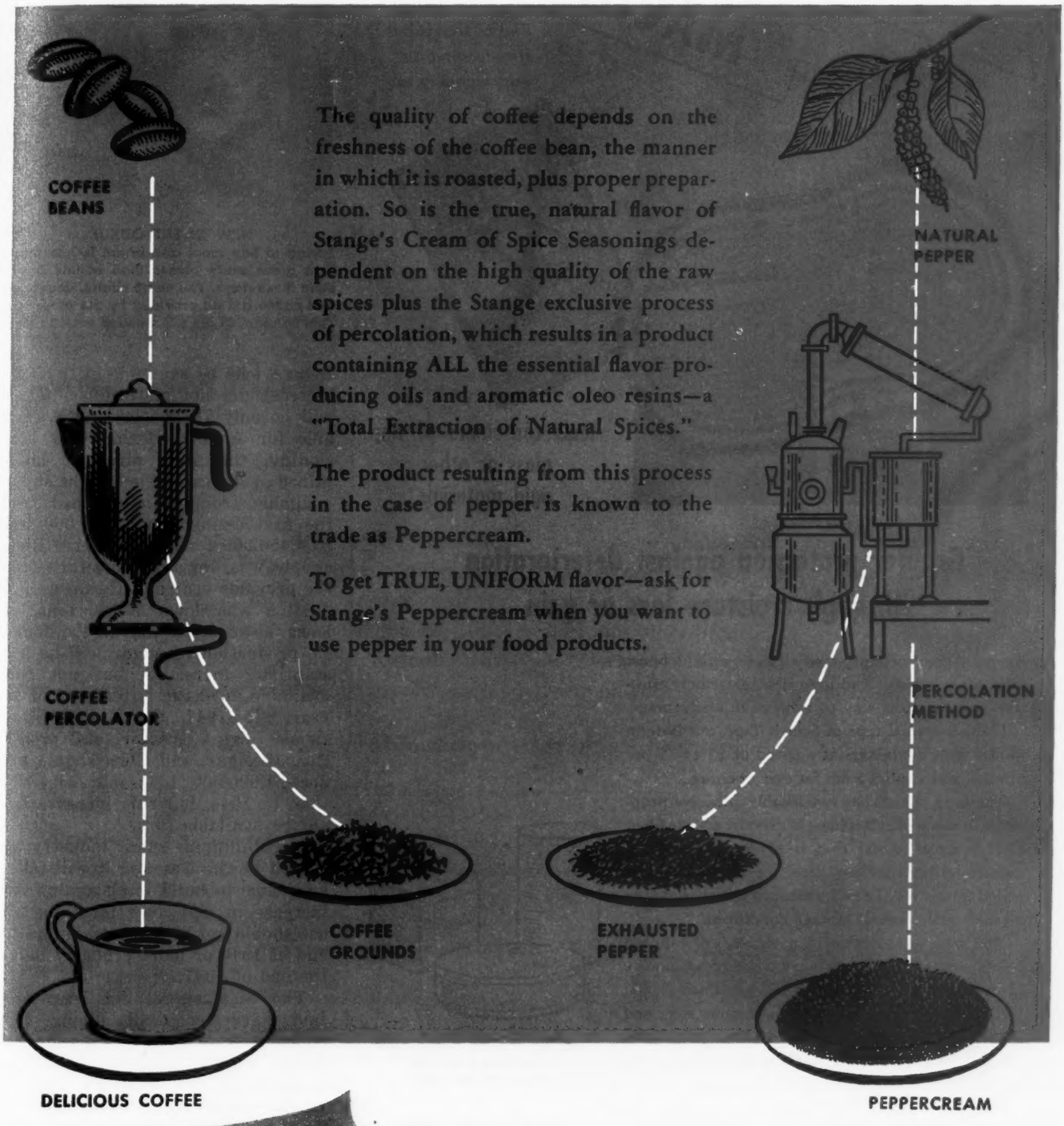
CONTINUED scarcity of ingredient materials in 1947 was predicted at the 37th annual convention of the Flavoring Extract Manufacturers Association, in Chicago, June 2 to 4.

No improvement is seen in the availability of corn sirups and corn sugars until late 1946. Lack of sufficient corn supplies is responsible. In the development of corn sugars for use in flavoring extracts, their low rate of solubility in comparison with cane sugar was a deterrent factor. At the outset of the war, however, an anhydrous beta-dextrose, with a rate of solubility even greater than that of sucrose, was produced. Production of this product was halted because of critical shortages of corn. When corn supplies again become plentiful the anhydrous beta-dextrose corn sugar will have many potentialities as a flavoring extract ingredient because of its higher solubility.

Despite optimistic predictions that

You don't Eat the Grounds

When You Drink Coffee



The quality of coffee depends on the freshness of the coffee bean, the manner in which it is roasted, plus proper preparation. So is the true, natural flavor of Stange's Cream of Spice Seasonings dependent on the high quality of the raw spices plus the Stange exclusive process of percolation, which results in a product containing ALL the essential flavor producing oils and aromatic oleo resins—a "Total Extraction of Natural Spices."

The product resulting from this process in the case of pepper is known to the trade as Peppercream.

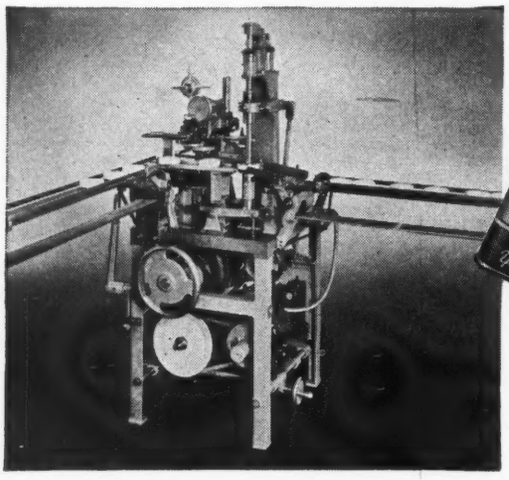
To get TRUE, UNIFORM flavor—ask for Stange's Peppercream when you want to use pepper in your food products.

Stange's CREAM OF SPICE SEASONINGS

• WM J. STANGE CO. •
2540 W. MONROE ST., CHICAGO 12, ILL.

New TAPE-SEALING MACHINE

End of seal is left free to serve as easy-opening tab



Seals containers of tin, glass or other rigid materials

Greater protection against deterioration through moisture loss or gain

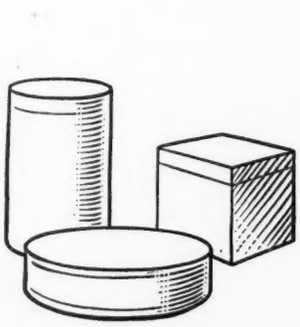
Keeping your product fresh longer should boost sales considerably. And here is an extremely effective and practical way to achieve this advantage.

Using a special type of Scotch Tape, our Nifong Model seals containers at a speed of 25 to 75 per minute, and applies a tab for easy opening.

The tape, which has remarkable adhesive properties, is made of cellophane backed by acetate fiber, and produces a seal that is practically air- and moisture-proof. Tobacco tins, for example, when sealed in this way keep the tobacco fresh for *at least a year*, under normal storage conditions.

The tape is available in a variety of standard colors; and special colors may be had to harmonize or contrast with the color of the container.

The machine is adaptable to various sizes and shapes of containers. If you will send us samples, we will be glad to show you how the tape seal can be adapted to your package.



Banding machine is adaptable to various sizes and shapes of containers

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Write for complete information

PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts

30 Church St., New York 7 • 111 W. Washington St., Chicago 2
101 W. Prospect Avenue, Cleveland 15 • 849 Marietta Street, N.W., Atlanta 3
443 S. San Pedro St., Los Angeles 13 • 18 Dickens Ave., Toronto 8

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

NEW IN THE QUEUE
Trying to buy meat and bread is lots worse in a great many places than at this Detroit store these days. The camp chairs, doughnuts and coffee are all provided by the proprietor, Tom Borman, as are the well-fed serving girls.

sugar would be available in 1946, the increase did not materialize. There will be only 73 lb. per capita available for Americans this year. Rationing, therefore, must be maintained at its present level. The supply available from Cuba dropped from the first estimate of 4,750,000 tons to 4,450,000 tons. The Puerto Rican supply was down 100,000 tons from the previous year and Hawaiian production was down 50,000 tons. It looks, however, as though the domestic production of sugar will be substantially increased, but not fully available until the latter part of the year. In 1947, the United States should have a greater total production of sugar, and Cuba should produce 1,000,000 tons more in 1947 than in 1946, but this increase may not be available to us.

The Philippine sugar industry was ruined by the war and it will take a long time to build it up again. Any increase in allowance for industrial use should not be expected before the end of 1946 or more probably before the end of 1947.

The Mexican vanilla bean crop, just harvested, will supply from 85,000 to 90,000 lb. of cuts and whole beans. Eighty percent of this crop is controlled by two curers. The next vanilla bean crop in Mexico is expected to be a good one and prices should be reasonable.

The French government and American importers have agreed on a quota of 250 tons of Bourbons from March to December of this year, at a $1.00 per kilo higher than the previous quota. At the time, this quantity seemed sufficient for the needs

Package Printing Problems?

NEW HYDRY BOOKLET TELLS LATEST DEVELOPMENTS IN FAST-DRYING, ODORLESS INKS

This illustrated booklet gives detailed information for use of the most important package-printing development in years . . . HYDRY moisture-set inks.

If you print or use packages for milk, cheese, butter, shortening, meat, cakes, bread, cereals, ice cream, sugar, flour, chewing gum, candy, tobacco or any one of numerous other products, this free booklet can save you money, help boost your sales-volume by showing you specific ways HYDRY outperforms other inks.

Check your big packaging problem at left. Then write on your letterhead for this new booklet.

Check your package-printing problem against HYDRY'S features

- **Fast Drying**—Dries on most stocks in 10 to 30 minutes; on presses equipped with steam applicator, dries *instantly!*
- **Odorless**—Finished prints entirely devoid of ink odor.
- **Brilliant Colors**—Ink film reflects light, gives superior brilliance and cleanliness.
- **Non-Offset**—Possibilities of offset reduced to a minimum.
- **Non-Smear**—Dry-hard finish extremely resistant to rubbing and smearing.
- **Non-Crystallizing**—Can be overprinted, even after several weeks.
- **Sharper Printing**—Does not spread or bleed.
- **Folding Qualities Improved**—Affords better moisture content in paper stock.
- **Improves Heat-Sealing of Waxed Wrappers**—Will not mix with wax film during heat-sealing operations.

hydry

Sun CHEMICAL CORPORATION

GENERAL PRINTING INK COMPANY DIVISION

Sun Chemical Corporation, 100 Sixth Avenue, New York 13, N. Y.

American Printing Ink • Eagle Printing Ink • Fuchs & Lang • Geo. H. Morrill • Pacific Coast • Sigmund Ullman • E. J. Kelly Company

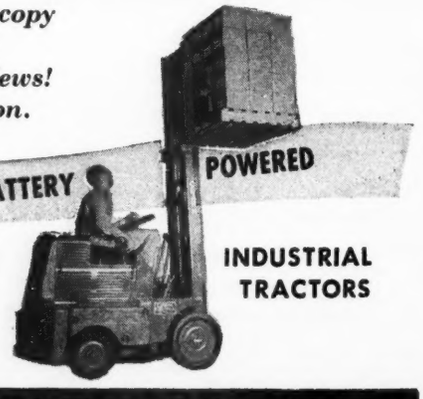
PLANS DEVELOP *Efficient* MATERIAL HANDLING

MODERN MACHINES carry out THOSE PLANS

CLARK *will serve you* BOTH WAYS!

CLARK FIELD ENGINEERS can show you how to speed production, cut costs, reduce accidents —lift the load from labor's back, freeing it for more skilled work.

Write for a copy of Material Handling News! No obligation.



CLARK TRUCTRACTOR
Division of CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN
OTHER PLANTS — BUCHANAN, JACKSON, BERRIEN SPRINGS, MICHIGAN

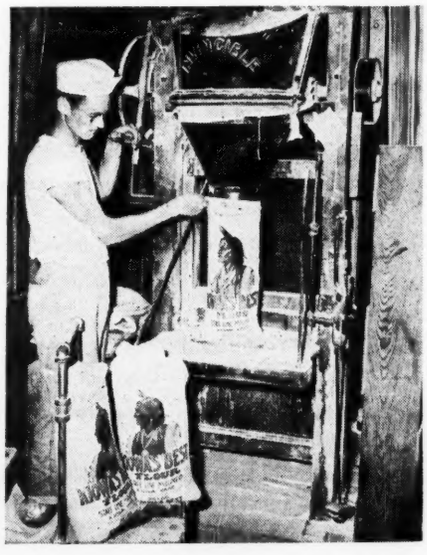
Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS
AXLES FOR TRUCKS AND BUSES • AXLE HOUSINGS • BLIND RIVETS
INDUSTRIAL TRUCKS AND TRACTORS • HIGH-SPEED DRILLS AND REAMERS
METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

of the manufacturers, but now 75 to 100 tons more seem to be needed to meet the demands for the balance of 1946. If this increased tonnage can be made available, the French government will want from 50 cents to $1.00 per kilo more than was previously agreed upon. Therefore, the price on vanilla beans will remain high for some time.

Another reason for the high price on vanilla beans is the high freight rate the importers must pay. In 1921, the freight rate from Madagascar to New York was $40 per ton. Now a 3 percent advalorem rate is added for the same distance, making the rate $435 per ton. If the goods are transferred at Durban, the rate is 5 percent advalorem, or $725 per ton. In addition, there are foreign bank charges and insurance charges that raise the price from 22 to 55 cents per pound.

Supplies of essential oils continue to be small. Oil of spearmint, oil of peppermint and oil of lemon are still very scarce. There was only 1,225,000 lb. of oil of peppermint available in 1945. California lemon oil will be close to normal by 1947, and some Italian oil will be coming in. No vanillin is available at the present time.

The possibilities of using N. D. G. A. as an antioxidant in a great variety of food products was discussed by Aladar Fonyo, William J. Stange Co. Results of experimental work have shown it to be an effective antioxidant for citrus fruit oils. Flavoring oils remained fresh from 120 to 260 days when N. D. G. A. was added.



NEW WHEAT

At least one mill, the State Line Milling Co., Kiowa, Kans., went into operation with newly harvested wheat, which made it possible for them to turn out 60,000 lb. in a 24-hour day. The sacking is being done by an ex-GI, who is taking on-the-job training.

How much is waste costing in YOUR plant?

Here's how you can reduce it with

BECKMAN pH CONTROL

IN industry after industry Beckman pH Control is reducing costs, minimizing waste, saving time and greatly increasing production efficiencies. Have *you* investigated what this amazing new profit tool can do in your plant? *Wherever there's water, there's pH.* So if you use water or water solutions of *any* kind . . . whether in pulps, liquids, or semi-solids—in process solutions, waste disposal or any other way . . . chances are that Beckman pH Control can help you do the job better—*for less.* Here, for example, is how others are slicing costs with Beckman equipment . . .

BECKMAN IS THE ONLY HIGH TEMPERATURE—HIGH pH EQUIPMENT

★ An important point to remember when installing pH control in your plant is that there is only ONE make of modern glass electrode pH equipment which can be used *continuously* in high temperature solutions. Even in boiling hot solutions, Beckman *High Temperature Glass Electrodes* give uniform accuracy and long life. This advancement is particularly useful in many food processes . . . in boiler feedwater conditioning . . . and in a wide range of chemical processing operations.

★ Beckman is also the *only* modern glass electrode equipment with which you can make high pH measurements *even in the presence of sodium ions* . . . a development that has extended the usefulness and accuracy of the glass electrode to many new industries where alkaline solutions, in combination with sodium ions, heretofore presented difficulties. A few of the many fields in which this Beckman development has proved indispensable include soap making, the manufacture of bleaches, detergents, etc.

SAVING CHEMICALS: By Beckman-controlling processes where chemicals are used, operations can be controlled so closely that overdosage and excess use of chemicals can be practically eliminated. Not only does this cut chemical costs, but it also assures more uniform processing, more accurate production control and greater plant efficiency.

REDUCING CORROSION: More and more plants are discovering the many advantages of reducing corrosion with Beckman pH Control. By Beckman controlling-process operations, these operators are able to regulate acidity and alkalinity — and thus neutralize excessively corrosive solutions before they damage costly plant equipment.

MINIMIZING REJECTS: Beckman pH Control is also making important savings by assuring more uniform quality of production. In many operations only a small change in pH makes a great difference in operation of the processing solutions. By Beckman-controlling the solutions, run after run is processed with identical quality, thus reducing rejects, cutting production costs and making greater savings in over-all efficiency.

SAVING TIME: Just as heat can frequently speed up chemical processes, so proper pH control can often save on processing time. Here again, even a relatively small saving on each production run quickly builds up to tremendous over-all savings in labor and plant overhead.

WHEREVER THERE'S WATER, THERE'S pH!

Let our engineering staff study *your* particular pH problem and make recommendations on the type of equipment best suited to your requirements. No obligation, of course.

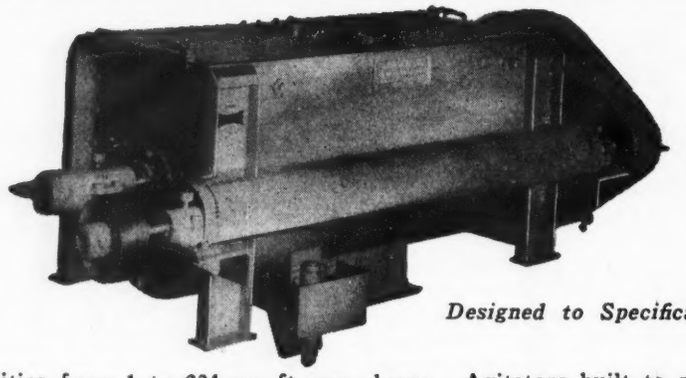
For helpful information on pH control, send for this free booklet "What Every Executive Should Know About pH!"

BECKMAN INSTRUMENTS • NATIONAL TECHNICAL LABORATORIES
SOUTH PASADENA 18, CALIFORNIA

BECKMAN **INSTRUMENTS CONTROL MODERN INDUSTRIES**

ROBINSON
PROCESSING UNIQUE EQUIPMENT

HORIZONTAL MIXERS



Designed to Specification!

Capacities from 1 to 234 cu. ft. per charge. Agitators built to relieve end load on bearings. Center inlet and discharge gates. Covers flush or sealed. Outboard roller bearings. Packing glands on mixer body. Robinson Processing Equipment designed by experienced engineers. Literature available. Inquiries invited.

ROBINSON MANUFACTURING CO.
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

SARDIK
TOMATO FLAKES

Now available in quantity for manufacturers interested in dry mixes in which tomato is a needed ingredient—such as—

Tomato Sauce
Tomato Seasoning
Chili Con Carne
Tomato Soup
Spaghetti Sauce
Spaghetti Dinners
Dry Soup Mixes

Tomato Flakes can also be used to supplement present supply of tomato puree as the flakes, after dehydration, blend readily with canned puree.

Samples sent promptly on request.

Tomato Flakes are processed and distributed by:

Sardik Food Products Corporation
420 Lexington Avenue, New York 17, New York

This antioxidant also helps prevent oxidative flavor changes in milk products and helps retain vitamin potency. N. D. G. A. has been successful in preventing rancidity in fish oils, coffee and coffee extracts, roasted peanuts, and potato chips. There is still a great deal of research work to be done in finding a better method of application of N. D. G. A. to food products.

Glass production for 1946 will be 115,000,000 gross in containers. This figure shows an increase of 10 percent over 1945 production. Restrictive orders on closures, however, will remain throughout the summer. There is no inventory in the hands of canners to pack this season's fruits and vegetables. There is also an acute shortage of molding powder for molding caps and little hope is seen for relief on metal caps.

The following officers were elected: president, William B. Durling, William J. Stange Co., Chicago; 1st vice-president, George M. Chapman, Liquid Carbonic Corp., Chicago; 2nd vice-president, Leslie Beggs, Styron-Beggs Co., Newark, Ohio; 3rd vice-president, John N. Curlett, McCormick & Co., Baltimore, Md.; secretary, Leland P. Symmes, Baker Extract, Springfield, Mass. (re-elected); treasurer, John H. Beach, Seeley & Co., New York; and attorney and executive secretary, John S. Hall, Chicago (re-elected).

PROCESSING

Government Reports On German Rye Bread

A NOVEL baking method for long-keeping rye bread was developed by the Germans during the war, to meet special needs of the Wehrmacht, according to a 23-page report, released by the Office of the Publication Board, Department of Commerce as PB-7915.

The report, made by investigators for the British Intelligence Objectives Subcommittee, briefly describes German methods for flour and bread production in the British and American occupation zones.

The rye bread is baked in an oven placed inside a steam boiler. Steam, at a temperature of 103 deg. C., is allowed access to the inner oven. After being baked, the bread is cooled, sliced, wrapped, and sterilized in an ordinary oven to prevent mold. The German inventors of the oven claimed that this process resulted in a fuel saving of 30 to 50 percent.

A disadvantage of the process is

WHEN AN ADHESIVE MUST *Resist Dew!*

RELY on National...with its wide knowledge of unusual adhesive uses... to provide protection against any form of moisture.

Do you need a moisture resistant adhesive . . . to protect quick-freeze packages against dew-formation . . . to protect bathroom packages against shower condensate . . . to protect potato bags against excessive moisture caused by freight car humidity . . . to prevent mildew during prolonged damp, dark storage?

Or is your problem more complex? Do you need a moisture resistant adhesive film . . . that supplies *breather action* to permit asphalt to be packaged and sealed while still steaming hot . . . that supplies a *moisture vapor barrier* to retain the freshness of various types of foods . . . that supplies *water barrier action* to prevent rain from causing ripples or cockles in heavy cardboard advertising displays?

Remember, moisture resistance is only one of many factors that control a successful adhesive formula. Of course, shop use must also be studied carefully. Shipping methods must be known. Consumer preferences must be analyzed. They have a direct bearing on final—and repeat sales!

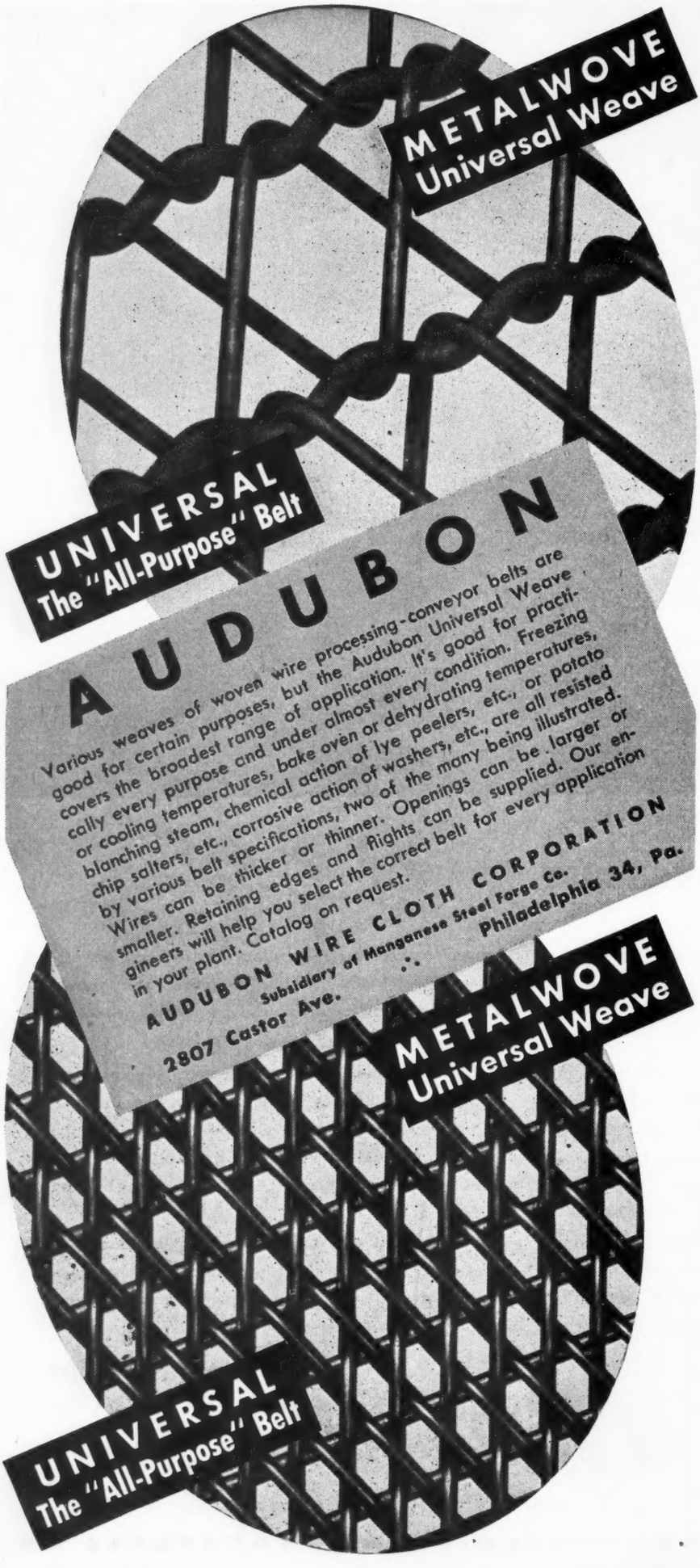
You can rely on National . . . with its knowledge of every type of adhesive formula and use . . . to give careful attention to every factor of your adhesive problem. Your inquiry is invited — NOW!

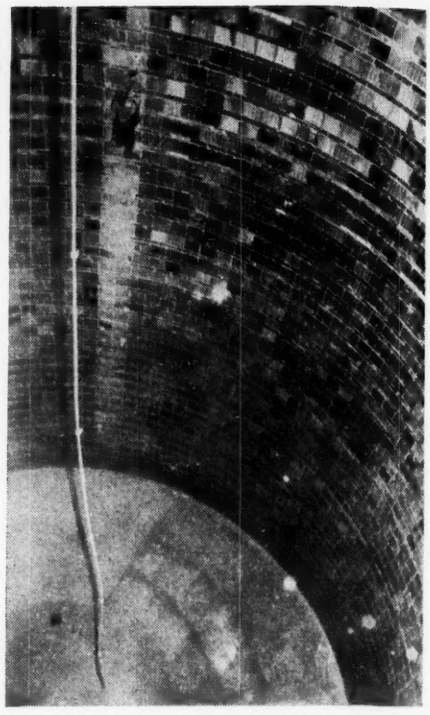
Danellen Plant

• Offices: 270 Madison Avenue, New York 16; 3641 So. Washtenaw Avenue, Chicago 32; 735 Battery Street, San Francisco 11, and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto. In England: National Adhesives, Ltd., Slough.

National ADHESIVES

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE


METALWOVE
Universal Weave
UNIVERSAL
The "All-Purpose" Belt
AUDUBON
Various weaves of woven wire processing-conveyor belts are good for certain purposes, but the Audubon Universal Weave covers the broadest range of application. It's good for practically every purpose and under almost every condition. Freezing or cooling temperatures, bake oven or dehydrating temperatures, blanching steam, chemical action of lye peelers, etc., or potato chip salters, etc., corrosive action of washers, etc., are all resisted by various belt specifications, two of the many being illustrated. Wires can be thicker or thinner. Openings can be larger or smaller. Retaining edges and flights can be supplied. Our engineers will help you select the correct belt for every application in your plant. Catalog on request.
AUDUBON WIRE CLOTH CORPORATION
Subsidiary of Manganese Steel Forge Co.
2807 Castor Ave. Philadelphia 34, Pa.
METALWOVE
Universal Weave
UNIVERSAL
The "All-Purpose" Belt



UNSCHEDULED INSPECTION
Swept clean of wheat during the shortage, this 125,000-bu. bin at the Van Dusen-Harrington elevator, Minneapolis, underwent an inspection on June 7, when the assistant superintendent was found by the photographer examining tile near the top of the 65-ft. tubular structure.

that the bread has no crust. The investigators thought than an attractive crust might be produced by a second brief baking, although this had not been tried.

The use of sawdust as a dusting material to prevent rye dough from sticking to baking tins was also noted in several bakeries by the investigators. This method, eliminating the use of grease, seemed effective.

German methods for grain storage, grading and milling; treatment of stale bread; canning of bread and biscuit manufacturing are also described in the report.

Photostats of the report are $2, microfilm, 50 cents.

Equipment Delays Slow Anhydrous Production

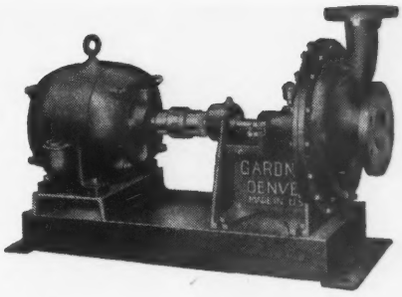
DELAYS in obtaining the machinery necessary to produce its anhydrous line of fruits and vegetables have forced American Home Foods to alter the plans made last November for quantity processing of this year's crops.

The current shortages of steel, fabrics, motors, wiring and other electrical supplies have made it impossible for the company to plan more than very limited production this year, according to the company

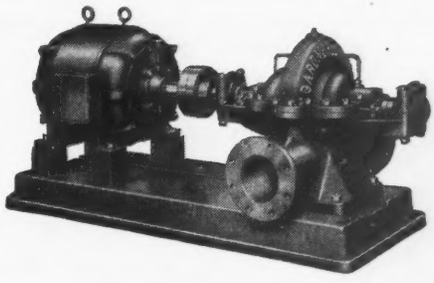
In the *Higher Efficiency* Brackets...

The smoothness and evenness with which water flows through your pump has a lot to do with pumping costs. In Gardner-Denver centrifugals, rigidly controlled foundry practices assure absolutely smooth water passages. Furthermore, these passages are properly proportioned to eliminate unnecessary eddies, back-waters and sudden changes in velocity. This—plus the inclusion of every other worthwhile hydraulic and mechanical feature—is why Gardner-Denver centrifugals are in the higher efficiency brackets. For complete information, write Gardner-Denver Company, Quincy, Illinois.

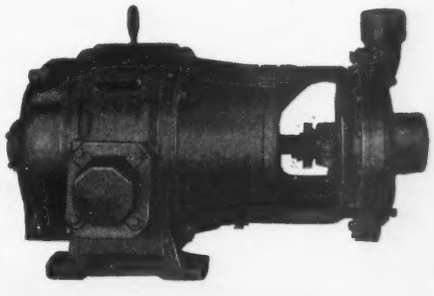
GARDNER-DENVER
Since 1859



Side Suction. *Designed for general service, these Gardner-Denver Side Suction Pumps are low in first cost, as well as in installation costs. Capacities up to 2.3 million gallons per day, or 1600 gallons per minute, can be handled in heads up to 100 feet.*



Double Suction. *Gardner-Denver Double Suction Single-Stage Centrifugal Pumps cover all heads up to 300 feet. These pumps have a horizontally split case for easy accessibility. Wearing rings are easily checked. The entire rotor assembly can be removed without disturbing the motor or piping, or exposing the bearings.*



Close Coupled. *In these Gardner-Denver Centrifugals, pump and motor are combined to form a complete, compact unit. Pumps can be installed in any position—on floor, wall or ceiling. These centrifugals are designed for capacities up to 250 gallons per minute, and heads up to 250 feet.*

ENGINEERING QUALITY Since 1859

FOR EFFECTIVE PROTECTION AGAINST FOOD PESTS

Hit them coming and going

WITH WESTVACO METHYL BROMIDE

By fumigating incoming raw materials in box cars, beneath tarpaulins or in vaults, and by fumigating loaded cars going to market, you save money as you safeguard your reputation.

It actually *costs less* to keep infestation down than to clean up badly-infested plants or risk consumer ill-will from polluted products.

To establish this two-way protection is good business . . . and easy with Westvaco Methyl Bromide! *Tests prove that Methyl Bromide gets a complete kill of pests under conditions where most fumigants are ineffective!*

WRITE FOR DETAILS

Important supplier of Methyl Bromide, Westvaco offers a constructive, on-the-job service in its application. Without cost or obligation, we will be pleased to furnish technical data and to recommend competent nearby industrial fumigators expert in the use of Westvaco Methyl Bromide.

Westvaco CHEMICALS

METHYL BROMIDE

FOR EFFECTIVE FUMIGATION

WESTVACO CHLORINE PRODUCTS CORPORATION
405 LEXINGTON AVENUE · NEW YORK 17, N. Y.
CHICAGO, ILL. GREENVILLE, S. C. NEWARK, CALIF.

president, H. W. Roden. One plant will be in operation before the end of the year, but several more will be required to satisfy the complete market. Hospitals, schools, restaurants, hotels and other mass feeding institutions, in certain areas, will be offered the opportunity to serve the new products some time early in 1947, according to the present plans.

As soon as the company can equip enough operating units to process each fruit and vegetable at its peak, and in sufficient quantities to serve several sections of the country on an equal basis, retail grocers will have the new foods to offer for home consumption, Mr. Roden declared.

Get Bakers' Cheese From Dried Skim Milk

A METHOD of making bakers' cheese from dried skim milk, instead of from liquid skim milk has been announced by the bureau of dairy industry of the U.S. Department of Agriculture.

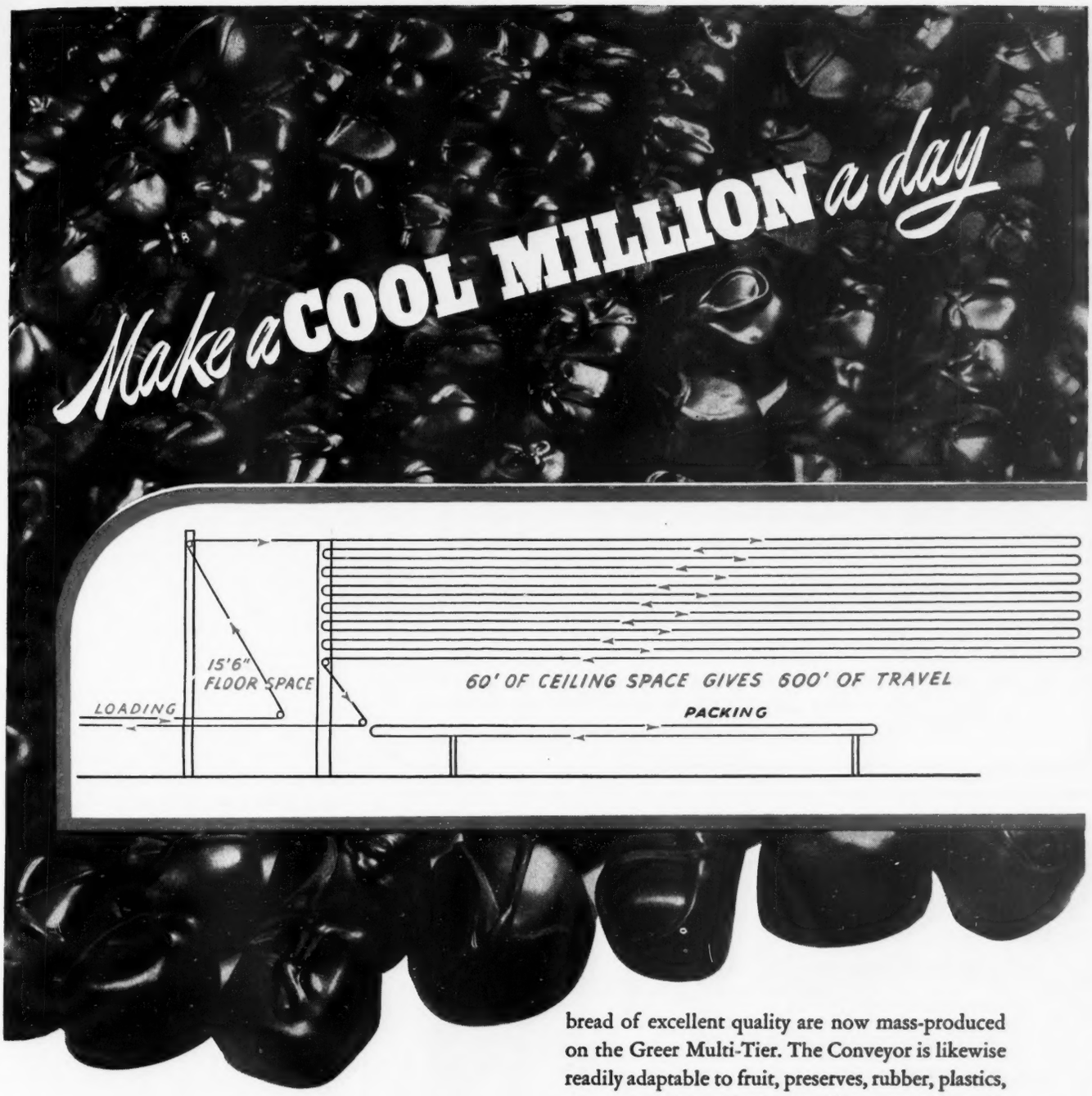
The method calls for reconstituting the dried skim milk with a quantity of water that will produce a milk with a higher solids content than normal milk. Good lactic starter and a small amount of rennet are added to the reconstituted milk and it is allowed to coagulate for 4 to 16 hours, depending on the temperature. When the curd is firmly coagulated it is placed in muslin bags (without being heated or cut) and allowed to stand until most of the whey has drained off. It is then ready for use or for packaging in suitable containers for marketing.

The yield of finished cheese varies from 1¾ to 2¼ lb. per pound of dried skim milk, depending on the conditions of manufacture and the amount of moisture wanted in the cheese. Spray-process milk powder must be used. Drum-dried milk lacks the necessary solubility.

The new method offers economies due to reduced costs of transportation, storage and freezing incurred under previous methods. It is entirely possible for bakers to store the milk powder and make cheese as needed.

New Brisling Process

A NEW mechanized method for preparing and packing brisling is being developed by Norway's fish canning industry. When perfected, a belt-line system will be set up by which the fish will be conveyed under infra-red rays to dry them, and then pickled through receiving a series of sprays. It is expected that the new method



Greer Engineering has revolutionized the mass production of quality chocolates. The Greer Multi-Tier Conveyor *can cool a million chocolates a day*—providing 600 feet of cooling travel in only 15½ feet of floor space. The process assures chocolates of higher gloss and longer shelf life.

This unique Greer principle of cooling and conveying has been applied with outstanding success in the bakery trade, also. Biscuits, cookies, and bread of excellent quality are now mass-produced on the Greer Multi-Tier. The Conveyor is likewise readily adaptable to fruit, preserves, rubber, plastics, wax, cosmetics, and other products requiring cooling, heating, drying, or pasteurizing.

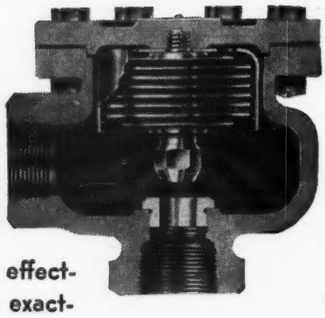
Overhead areas are readily utilized even to the height of two or three stories. This reduces the amount of non-productive floor space to a minimum. If greater mass production of higher quality goods is your goal, write at once for free Folder F-7, giving detailed information about the Greer Multi-Tier Conveyor.—J. W. Greer Company, 119 Windsor Street, Cambridge 39, Mass.

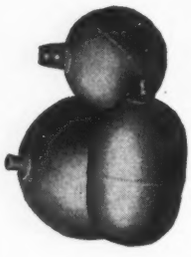
MAKERS OF FAMOUS **GREER** MULTI-TIER CONVEYORS

BETTER CONTROL OF PROCESS VARIABLES

Assured with

NICHOLSON
Traps and Floats





Because they so effectively combine exactness of control and ability to take necessary abuse, Nicholson traps and floats are being increasingly adopted by producers in systems for the removal of process variables. Plant records show they increase production and aid in maintaining quality standards. Types for almost every processing application.

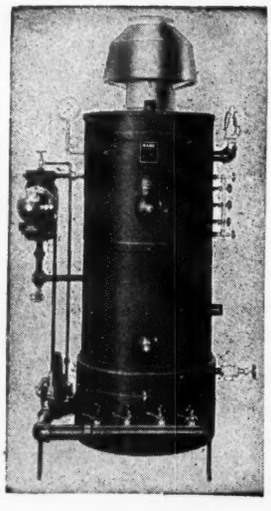
Send for BULLETINS or See Our Catalog in Sweet's

W. H. NICHOLSON & CO.
193 OREGON ST., WILKES-BARRE, PA.

ENGINEERED STEAM . . . FOR FOOD PROCESSING PLANTS

A combination of four elements, constituting our *Engineered Steam*, keeps things moving in many a food processing plant today. These elements are:

1. THE KANE BOILER
2. EFFICIENT CONTROLS
3. MKO AUTOMATIC BOILER FEED
4. EXPERIENCE



The outgrowth of 40 years' design and construction, the KANE, automatic, gas-fired boiler, built in sizes up to 30 H. P., supplies steam of maximum cleanliness. Efficient controls insure safety and maintain precise temperature needed. Condensate is returned automatically by the MKO boiler feed. Our experience enables us to judge the equipment best suited to the particular requirements of your plant.

Condensate Return System. Automatically returns hot condensate and adds needed make-up water.

Engineered Steam complies with A.S.M.E. standards; honest construction and the best materials obtainable mean years of trouble-free service.

Under present conditions the demand for *Engineered Steam* is far ahead of our ability to supply, but we will try to fill your most urgent needs as soon as we possibly can.

MEARS KANE O'NEILL
Manufacturers of Automatic Steam Boilers for over a third of a century
1903-1915 EAST HAGERT STREET, PHILADELPHIA

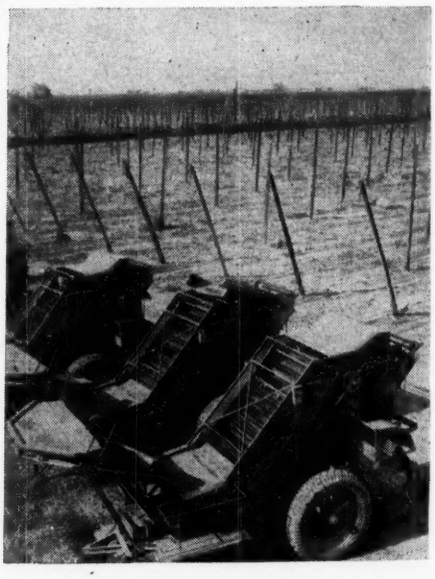
will not only retain the brisling's best characteristics but improve the finished product.

With this and other developments in mind, the Norwegian canning industry proposes to double its research expenditures this year to a total of about $60,000. The new technics are being worked out in the industry's laboratories at Stavanger.

Conclude Hearings on Corn Meal Standards

INDUSTRY spokesmen for corn millers again protested the proposed standards for corn meal during the early June hearings. Control laboratories, equipment and personnel were said to be lacking at many small mills. The aid of Dr. E. V. McCollum, noted nutritionist, was also enlisted in opposition to the proposed standards. It was his feeling that enrichment of such staple foods as corn meal would be less helpful to the national diet than education of consumers to eat a better-rounded diet, supplementing corn meal, for example, with larger quantities of meat, milk and leafy vegetables.

The Food and Drug Administration submitted data from field surveys to show that the proposed standards are already being met. Products from several dozen mills have been analyzed and virtually 100 percent compliance with the proposed moisture, fat, and granulation standards was found. Principal F&DA objection to present industry practices is in the labeling of some of



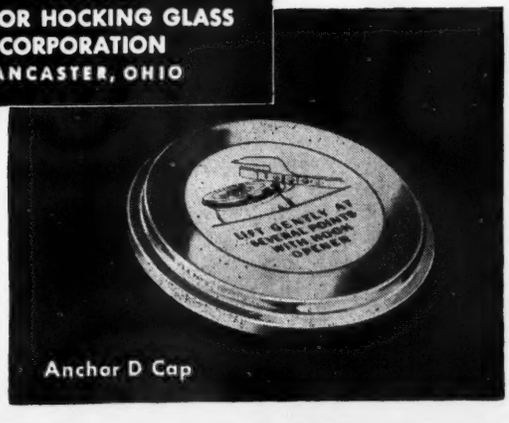
LOTS OF HOPS
The U. S. is now the top hop producing nation, and the state of Washington, with 21,060,000 lb. raised last year, tops the U. S. It is estimated that 65 percent of the state's hops are picked by machines, such as those shown here. Virtually all hops go into beer.

Keep your products Delightful, Delicious, Delectable *with Anchor* D *Caps*

Anchor
CONTAINERS AND CAPS

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO

Tune in ANCHOR HOCKING'S HOBBY LOBBY
CBS NETWORK . . . THURS. EVE.



Anchor D Cap

FOR a third of a century housewives have been accustomed to buying fruits, vegetables, sea foods, meats, relishes, spreads and many other products sealed with Anchor D Caps. They unconsciously, but instantly, recognize these seals as the symbols of delightful factory-fresh foods; foods that possess all their original delectable flavor and goodness.

Throughout the years Anchor D Caps have won universal confidence through consistent performance. They are still unsurpassed for their tamperproof, leakproof, airtight and vacuum seal dependability . . . and may be used in sterilizing, processing, in hot or cold packing.

Be sure that the delightful, delicious, delectable qualities of the products packaged in your plant are kept intact until consumed. Seal your products with Anchor D Caps.

FORD TRUCKS LAST LONGER!

More Ford Trucks in Use Today Than Any Other Make!

Ford

MORE PROFITS THROUGH *Scientific* CHEMICAL RESEARCH

TRUESDAIL offers clients a thoroughgoing scientific chemical knowledge, supplemented by years of experience with many type of research and quality control problem, that adapts Truesdail Service to local and national needs.

You can depend on Truesdail for specialized research and consultation . . . for *Science with a Sales Slant!*

Write Us Today About Your Problem

PRODUCT FORMULATIONS
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AMERICAN COUNCIL OF COMMERCIAL LABORATORIES

SPECIAL FACILITIES FOR FOODS

these products, so that the fiber content cannot be predicted from the label description of the contents.

August 8 was set by the presiding officer as the date by which final briefs must be submitted. The proposed order will probably appear in the late summer or early fall.

Improved Milk Test Shows Pasteurization

AN improved phosphatase test to determine whether milk has been pasteurized or not has been developed by the bureau of dairy industry of the U. S. Department of Agriculture.

The test is simple, quick, reliable and requires a minimum of laboratory equipment. Of equal importance is its preciseness. It will detect 1 lb. of raw milk in 2,000 lb. of properly pasteurized milk. Not only that, the test has been modified to determine whether the milk used in making cheese has been pasteurized. The preciseness of the test on cheese has been found comparable to the results on milk.

It should be noted that it is a test for pasteurization and not a test for possible contamination after the milk has been processed.

The process depends on the presence or absence of an enzyme. The enzyme is inactivated at a temperature only a few degrees higher than that necessary to render harmless the most resistant pathogenic organisms. Therefore, a negative test indicates the adequacy of pasteurization.

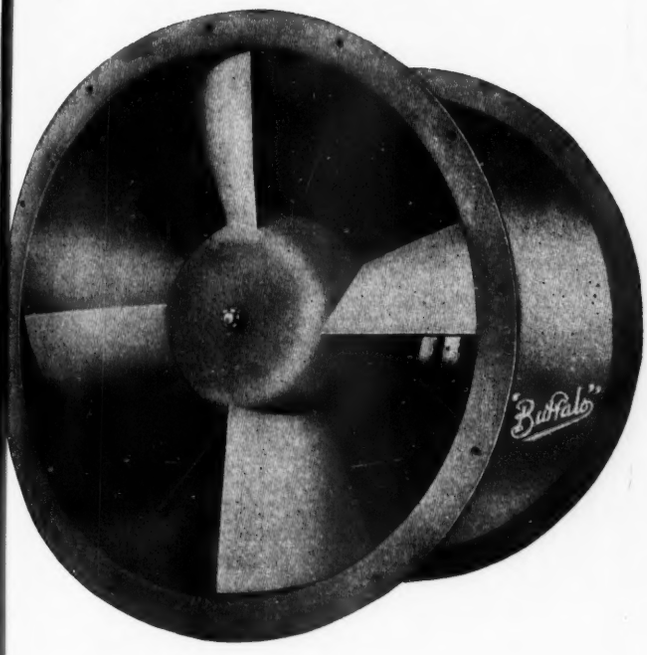
Since phosphatases are constituents of so many vegetables and foods, the test has many applications in the control of processing procedures in the food field. It also seems probable that the test will gain wide use in regulatory work.

Paste Standards Eased By Proposed Amendment

USE of gluten in standardized alimentary paste products was limited, and use of vitamins made the subject of a new definition and standard of identity in a proposed order issued by the Federal Security administrator and published in the Federal Register on May 14, pages 5232 to 5235. This action marks one further step in the official action on proposed amendments to existing standards, for which hearings were held last fall and winter.

The proposed order for use of gluten was "that no definition and standard of identity for gluten macaroni products be promulgated" and that use of gluten be limited to "such

THOUSANDS of these great "Buffalo" Fans are in Service



They ARE great fans—not because we say so, but because thousands of users say so. On every kind of ventilating and air conditioning job you'll find Buffalo Limit-Load and Axial Flow Fans in service.

During the past five years, more Buffalo Axial Flow Fans were supplied to the U.S. Navy than any other make—during the same period, these and Limit-Load Fans were also supplied by thousands to Industry.

When you have a job that requires reliable, efficient air-moving—there is a Buffalo Fan to give you the best results.

BUFFALO FORGE COMPANY

152 Mortimer St., Buffalo, N. Y. **Canadian Blower & Forge Company, Ltd., Kitchener, Ont.**

here's a "RIGHT" "Buffalo" FAN for every jo

undisputable superiority . .

. . . FOR SAFE PACKAGING

INLAND STEEL CONTAINERS

Made in a wide variety of cover styles and openings suitable for easy filling and safe airtight packaging of products.

NO LEAKAGE
NO SPOILAGE
NO CONTAMINATION

1. Lever locking ring drum No. 55188
2. Lever locking ring pail No. 514X
3. Swivel-spout por-pail No. 584R
4. Band seal pail No. 564
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INLAND STEEL CONTAINER CO.

Container Specialists

6532 S. MENARD AVE., CHICAGO 38, ILLINOIS

Plants at: Chicago • New Orleans • Jersey City

COFFEE HOUSE

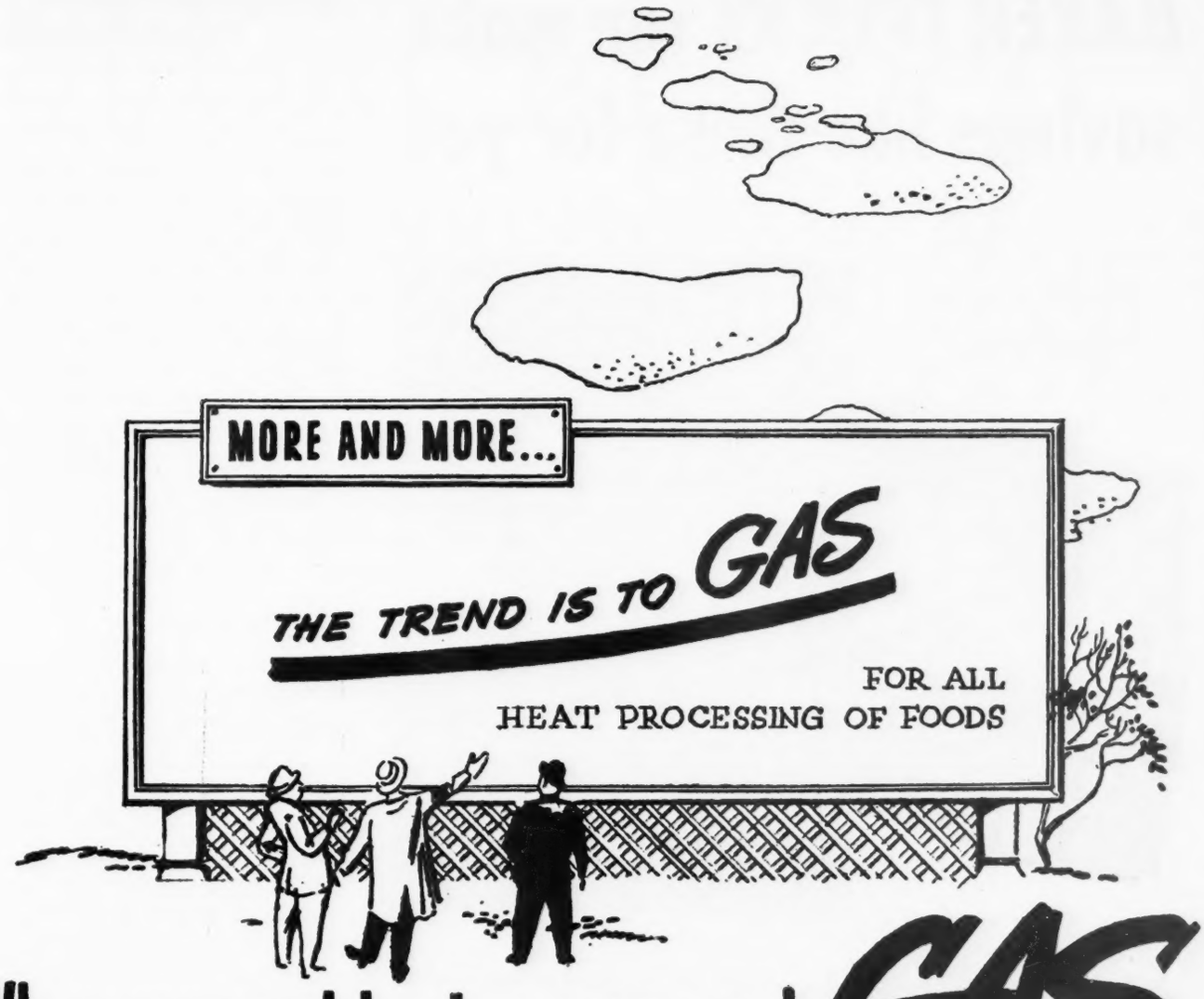
The coffee industry was hoping for the removal of most price restrictions as the June 30th termination of the 3-cent subsidy approached. They could only hope that imports such as are shown here would not be interrupted. This coffee is being stored in a New Orleans dock shed, prior to further shipment to the various buyers.

quantity that the protein content of the finished food is no more than 13 percent by weight." Provision was made for use of gluten as an optional ingredient in all alimentary pastes except whole wheat macaroni.

The proposed order for use of vitamins and minerals in alimentary pastes was that they be limited to products called "enriched macaroni products" and "enriched noodle products," for which new definitions and standards of identity were proposed. These enriched products must contain thiamine, riboflavin, iron, and niacin or niacin amide. Optional enriching ingredients include vitamin D, calcium, and partly defatted wheat germ. Minimum and maximum contents for all these ingredients are prescribed.

Exceptions to the proposed order, which could be filed within 20 days from the date of publication, were received only from the proponents of the proposed new standards, two manufacturers in the case of vitamin addition and one manufacturer in the case of gluten.

The final order for these alimentary paste standards may now be issued by the Federal Security administrator at any time. Average prewar time requirement for final standards was about two and one-half months after the proposed order.



When you need heat....you need GAS

More and more "The Trend is to GAS" in the food industry. More and more, GAS and modern Gas equipment fulfill the exacting specifications set up by engineers and production executives for all large-scale food preparation processes requiring heat.

On every count, in comparison with other heat sources, GAS is the ideal heating medium. Wherever heat is required in food manufacturing processes, there's a job for GAS. Characteristics of GAS—features of importance to management—include:

- Flexibility
- Cleanliness
- Rapid Heating
- Economy of Operation
- Precise Controllability
- Dependability
- Versatility of Application
- Labor-Saving Automatic Regulation

Your local Gas Company will send an Industrial Representative to explain why:

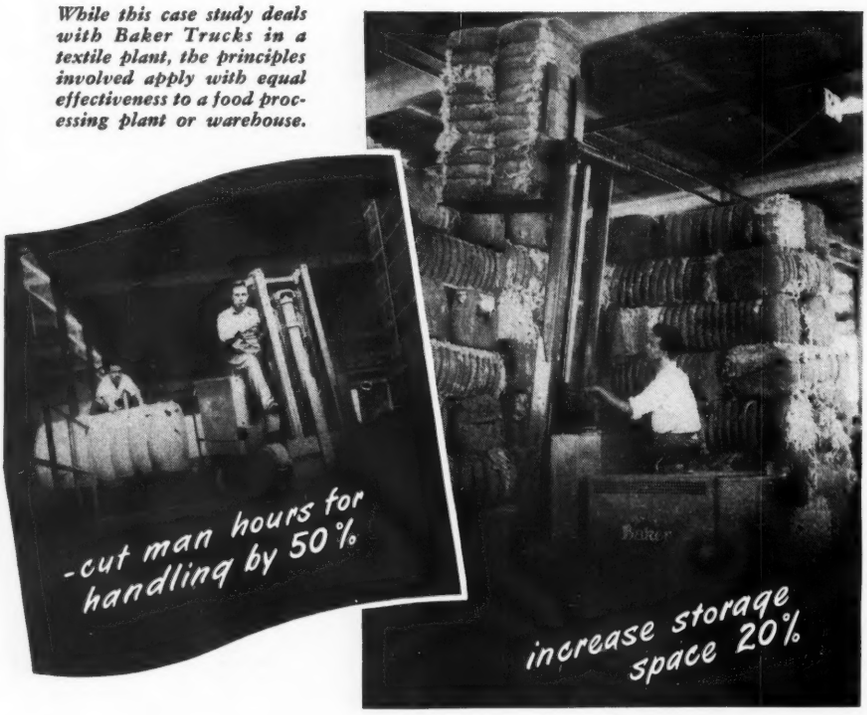
When You Need Heat—You Need GAS.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE NEW YORK 17, N. Y.

BAKER TRUCKS can make savings like these for you

While this case study deals with Baker Trucks in a textile plant, the principles involved apply with equal effectiveness to a food processing plant or warehouse.



A. and M. Karagheusian, Inc. is one of the world's largest manufacturers and importers of Chinese and Persian rugs. They are also one of the leading domestic carpet manufacturers and are nationally known as the "Makers of Gulistan Rugs and Carpets". Bales of wool, weighing from 350 to 1200 lbs. are received in carload lots from all parts of the world. Baker Fork Trucks unload these bales and transport them to storage and processing departments—saving up to 50% in manpower hours over former methods. One of the trucks stack bales, for storage, to a height of over 200 inches, enabling the company to use up 20% more warehouse space.

Our files contain many case histories of Baker Trucks making similar savings in all types of plant and warehouse operations. A Baker Material Handling Engineer will gladly show you how they may be applied to your problem.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
2146 West 25th Street • Cleveland, Ohio
In Canada:
Railway and Power Engineering Corporation, Limited

Member:
Electric Industrial Truck Association

Baker INDUSTRIAL TRUCKS

Chicago Dairy Tech Awards Scholarships

THE Chicago Dairy Technology Society has awarded two scholarships to university students majoring in dairy technology. One scholarship is for $400 for a 4-year course to a student majoring in dairy technology at the University of Illinois. Max W. Moeller, Jr., an Elgin, Ill. high school graduate was awarded the scholarship this year. The student is chosen from the Chicago metropolitan area by a committee composed of the university faculty headed by Prof. Paul Tracy.

The other scholarship is for $200 to a student having already had two years in the dairy technology course at the University of Illinois. The student selected by the university was Donald R. Olson, Chicago, a veteran and junior at the university.

Food Yeasts

EFFORTS to alleviate the undernourishment of the poorer classes in Chile include experiments now under way in Santiago on the use of food yeasts as a defense against protein deficiency. Brewers yeast, molasses yeast, and yeast from a grape residue that cannot be used for wine are being studied. In addition, a new condensed milk factory with a daily capacity in excess of 13,000 gal. has opened in the Osorno region.

RAW MATERIALS

Vegetable Oil Supply Changes Are Foreseen

MAKERS of oleomargarine, shortenings, salad oils, peanut butter, and a host of other foods using vegetable oils face significant changes in world supplies of their raw materials over the next decade. This conclusion emerges from a survey of world trends in oil crops, made by a Department of Agriculture expert and recently published by the department.

By 1955 world output of the major oil crops may be as much as a third above the prewar level. Most of this increase is due in tropical countries, where large-scale plantation methods are forging ahead. Consequently, world exports of these crops may jump 20 percent by 1955.

Since improvement in technology is making the various fats and oils increasingly interchangeable, prospective trends in supplies of several different oils are important to many manufacturers. Although special

How to Keep

YOUR MILL RUNNING AT

Full Capacity!

★

DURING four long wartime years U. S. milling and processing plants have been a veritable beehive of activity — with minimum down-time for repairs and replacement of equipment.

Peacetime normally would mean a chance for time out to replace worn equipment — to *modernize* with new, more efficient machinery.

But peacetime, today, finds the world facing a critical food shortage. And as a result, United States mills must *continue* on a peak production basis.

Allis-Chalmers pledges its aid in an all-out effort to keep *your* mill running at full capacity. But a *fresh* look must be taken at the industry's equipment . . . to make *sure* that present machinery will stand the strain. We urge you to check *now* for repairs and new equipment requirements. We recommend that you plan ahead for a year or two . . . and place orders *today* for all equipment needs.

Whatever your requirements may be — repairs, replacements or complete plant modernization — Allis-Chalmers can help you. A-C's milling and processing line — widest in the world — is available for choice selection. And A-C's cooperative engineering and laboratory research will aid in the development of new milling equipment, new extraction processes.

Call on our nearby A-C office for quick service in the handling of your milling problems. Or write direct to ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 2011

NEW BULLETIN

B6194-A shows complete A-C line of milling and processing machinery, including allied power and electrical equipment. Send for your free copy!

WORLD'S LARGEST PRODUCER OF MILLING AND PROCESSING EQUIPMENT

Roller Mills

Rotary Coolers

Speedy Packers

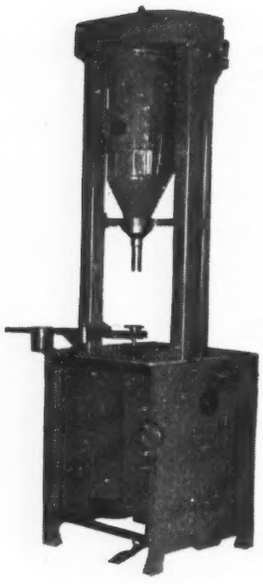
Rugged Flaking Mills

High Capacity Sifters

Efficient Dryers

ALLIS-CHALMERS

NEW S&S *Universal* FILLING MACHINE



. . . for filling practically any material but liquids

Incorporating many improvements, this new model of our old, reliable Universal Filling Machine, is designed to do an even better job than its popular predecessor. The new machine features heavier construction where needed, increased drive efficiency and greater convenience for the operator.

This means added operation proficiency, steadier production and lower cost packaging for the user . . . for *you*. S & S Universal Fillers are supplied as one, two or four station machines; auger or centrifugal feed to accommodate material to be filled.

Packers of nationally known products have followed our recommendations for the best methods of filling and handling their packaging—with excellent results. Now is a good time to consult us about *your* packaging problems . . . without obligation, of course.

Although deliveries are uncertain, due to an accumulation of back orders, it will pay you to wait for an S & S machine, the *right* machine for the job.

STOKES & SMITH Co

4911 Summerdale Ave., Philadelphia 24, U. S. A.

FILLING : PACKAGING : WRAPPING MACHINES

Speeds to suit your needs — 15 - 30 - 60 - 120 per hour

"Better machines for better packages"

qualities of each oil will continue to be significant, substitutions on the basis of price differences will become more and more common.

At present, of course, extraneous factors other than suitability and relative costs affect the amount of substitution. World trade is still badly disorganized, and production in many areas still limps from the disruptive effects of war. Here at home, ceiling prices remain in effect. We are still in a period of abnormal foreign demand for American fats and oils and are just emerging from the wartime scarcity of oil supplies from foreign countries. Instead of being a net importer of as much as 2,500,000,000 lb. of oil and seeds, we became during the war years a net exporter.

These unusual conditions will not last. Assuming reasonable prosperity and world peace, the international trade on a somewhat freer basis than before the war, U. S. manufacturers in coming years will be able to draw on the world's expanded crops of oils. It will pay them to consider prospects for each important vegetable oil.

No One Excited Over Red's Perennial Wheat

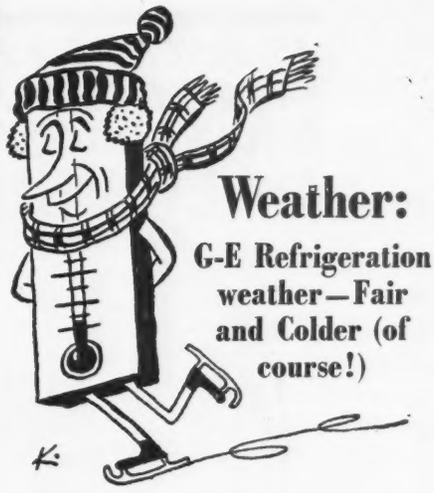
WORD from Russia tells of the development of several new varieties of grain, including a perennial wheat that yields two or three harvests from one sowing, according to Nikolai Tsitsin, head of the USSR Academy of Sciences' Central Botanical Gardens. The Moscow report quotes Mr. Tsitsin as saying, "Some scientists were skeptical of the idea of developing a perennial wheat. This problem may now be considered as solved. For two years now perennial wheat has been giving quite high yields in Moscow Region. At present we have five kinds of perennial wheat which give two or three harvests."

The U. S. Department of Agriculture does not share the enthusiasm of the Russians for the perennial strains. Reports of the development of a perennial wheat have persisted for ten years or more without confirmation.

Work on the development of a perennial variety of wheat was started in this country in 1930, and some so-called "perennial" wheats have resulted. In making the crosses, nothing has been done to develop the milling and baking qualities, which would be necessary for the wheat to be sold in the U. S. market.

So far, the best yields that have been recorded by the perennial varieties of wheat in this country are

The Daily Freeze



Weather:
G-E Refrigeration weather—Fair and Colder (of course!)

Cabinet Shake-Up Finds G-E Condensing Unit Going Strong

"It takes more than a little rough treatment to bother me," says Mr. G-E Condensing Unit. "That's why I'm chosen as the heart of so many ice cream cabinets. Even in an emergency, I'm calm, collected and cool."

Oldtimer Gives Secret of Long Life

G-E Condensing Unit, famous for years of faithful performance, told the Daily Freeze yesterday, "I can sum up the reason for my long life on the job rather simply—precision manufacture and the use of the finest materials!"

SPORTS

"In fishing as in refrigeration, know-how pays off," says G-E Condensing Unit, heart of top-notch refrigeration systems.

Beverage in Cooler 30 Days

"I feel fine," said Mr. Beverage. "In fact, the way the G-E Condensing Unit takes care of me, I'm even better than the day I arrived. Here's for more Beverage Coolers with G-E Condensing Units!"

· PERSONAL ·

Joe, sorry I couldn't supply new G-E Condensing Unit right away. I'll get one for you just as soon as I can . . . know you'll forgive me. Let me help you solve your refrigeration problems. You'll find me listed under "Refrigeration" in your Classified Telephone Directory.

Your G-E Dealer

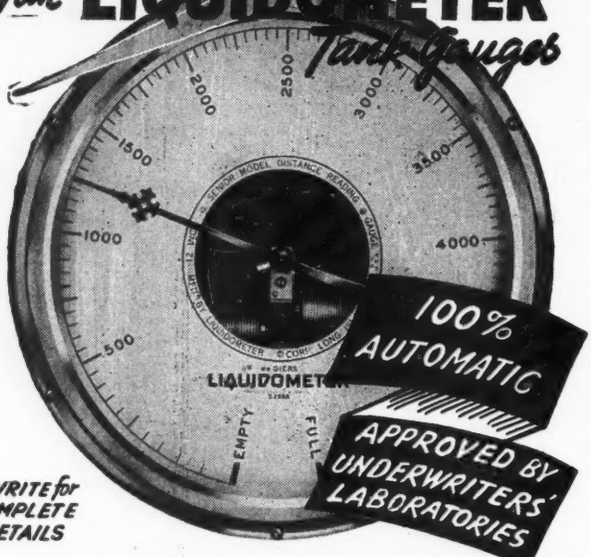
LOCKER PLANTS *Growing Fast*

With business booming, locker plant operators are thinking about expansion. Many a smart operator is calling in his G-E distributor for suggestions on the best possible refrigeration set-up for present and future business. G-E folks are always glad to help.

General Electric Company, Air Conditioning Department, Section 6897, Bloomfield, N. J.

GENERAL ELECTRIC

AS QUICK AS A FLASH YOU CAN KNOW THE EXACT MEASUREMENT OF YOUR VALUABLE STORED LIQUIDS With LIQUIDOMETER Tank Gauges



"LIQUIDS WORTH STORING ARE WORTH MEASURING"

THE LIQUIDOMETER CORP.
38-14 SKILLMAN AVE., LONG ISLAND CITY, L.N.Y.

about 60 percent of the standard annuals in the first year. The second year has been about 50 percent of the yield of the first year. The third year, the yield has been only from 5 to 10 percent of the first year.

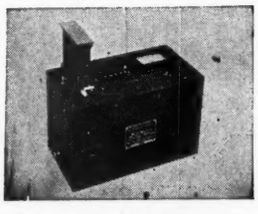
Department of Agriculture officials have been particularly interested in the disease resistance found in the wild relatives of annual wheat. U. S. scientists prefer to cross annual wheat with perennial grasses of the same family to produce varieties with greater resistance not only to disease, but also to cold and drought. It has been noted that the wild relatives are in many instances resistant to disease to which the annuals continue to be susceptible. Therefore, work on the crossing of annual wheat with related species continues in order to build up disease-resistant "perennial" stock for later crossing with the annual varieties.

Fats and Oils Exports Moving on Schedule

A TOTAL of 131,000 tons of fats and oils was made available by the Commodity Credit Corporation between January 1 and May 17 this year for delivery to UNRRA and to European countries, the Department of Agriculture announced recently.

Allocations for fats and oils export during the entire six months period from January 1 to July 1, 1946, total 174,000 tons—including the carryover of previous allocations, which were not shipped before January 1, but not including an allowance of about 14,000 tons for continuing commercial exports. Total supplies made available for delivery

Steinlite



MOISTURE TESTER

The Fastest in Commercial Use

For really fast work in testing moisture content of dehydrated foods . . . dried eggs, nuts, cocoa and a host of other products . . . use the Steinlite. Almost any operator can get results in two or three minutes . . . a good operator in one minute. Yet the Steinlite is reliable and dependable. It is precision built by a pioneer firm of radio engineers and calibrated against official oven methods. Sold on free trial basis. No money down. Write for circular.

HEADQUARTERS FOR EQUIPMENT

Come to Seedburo for hundreds of items of equipment and supplies . . . seed testing, grain grading, plant maintenance, etc. If you have not received your copy of the Seedburo Catalog and Grain Graders Guide write today.

634 BROOKS BUILDING CHICAGO 6, ILLINOIS

SEEDBURO EQUIPMENT COMPANY

Formerly SEED TRADE REPORTING BUREAU FOUNDED 1912

WE'RE ASKING THEM TO HELP KEEP EMPTIES IN CIRCULATION
LET'S DO OUR SHARE BY CHEERFULLY MAKING PICK-UPS
O.K. Fellows! KEEP 'EM COMIN WE NEED 'EM BACK AT THE DAIRY

RETURN BOTTLES

This poster, in color, has been sent to dairies throughout the country, by Owens-Illinois Glass Co., as part of the campaign to urge drivers to get bottles back into circulation.

This 6-wheel Mack LJSW is setting a superb record of fast, economical operation for the Tobin Packing Company.

6-WHEEL PERFORMANCE WITH 4-WHEEL ECONOMY

Tobin Packing Company of Rochester, N.Y. bought this 6-wheel Mack unit to deliver meat products to its dealers in northern New York State, Watertown, Massena and the Adirondack Mountain area, where winter road conditions are unusually severe. Running more than 1,000 miles a week, over routes often clogged by snow and ice, this truck has performed so successfully that the Company has ordered 7 more identical units.

Designed for legal-limit payloads, the combination of Mack Model LJSW with SW-30 bogie proved to be highly economical. Operating and fuel consumption costs under a gross load of 45,000 pounds did not exceed those of the ordinary four-wheel truck with smaller load capacity. Also, because of better brakes and lower center of gravity, the unit was found to be safer at high speeds and can therefore maintain a greater load average speed than any type of truck ever used for the job.

The body carries 25,000 pounds of meat products, is fully insulated, mechanically refrigerated, and maintains an inside temperature of 40 degrees under all conditions.

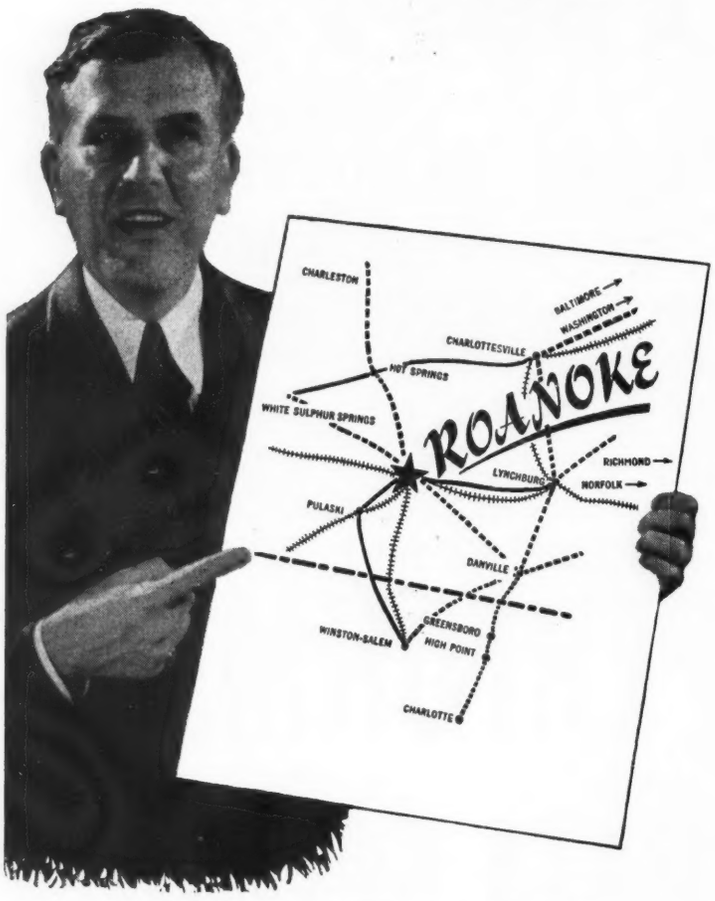
Mack has the efficient solution of *your* trucking problems, too. Why not talk to your local Mack man about it?

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

Mack
TRUCKS
FOR EVERY PURPOSE

Performance Counts!

A NATURAL BY THE MAP!



Strategically centered between producer and consumer . . . on the main line of the Norfolk & Western and Virginian railroads . . together with arterial highways . . . ROANOKE is ideally located to cold storage your perishable foods. 1,000,000 cubic feet of modern cooler and freezer space with complete financial protection. For ready access to your markets . . . plus rapid handling to insure speedy distribution . . . . . choose ROANOKE. Icing facilities available. Write for illustrated folder.

Roanoke Ice & Cold Storage

ROANOKE, VIRGINIA

up to May 17—approximately three-fourths of the six months period—are on schedule, at 75 percent of the total allocation for the period.

The percentage of different commodity allocations within the fats and oils group, which had been procured and made available by May 17, varied considerably. Lard and shortening availability was somewhat less than three-fourths the total allocations for the full six months period, while procurement of soybean and peanut oil, coconut oil, margarine, and soap was more than three-fourths the total. The weighted average for all commodities in the group was 75 percent.

Cronkhite to Handle Meat Set-aside Orders

E. J. CRONKHITE, chief of the meat merchandising division of the livestock branch, Production and Marketing Administration, will serve as administrator of War Food Orders 75.2 (beef), 75.3 (pork and pork products), 75.4 (veal), 75.6 (mutton), and 75.8 (canned meats). He took over his duties as administrator of the five orders on June 1.

Mr. Cronkhite, who has been associated with the department's meat procurement activities for nearly four years and division chief two years, will continue as chief of the meat purchasing division. W. S. Waterbury, who has served as administrator of the meat set-aside orders since 1942, is retiring from the government service.

As heretofore, the orders will be administered from the Chicago office of PMA.

Air-Expressed Plants Promise More Tomatoes

TOMATO PROCESSORS can look forward to increased production next year, based on plans now under way at Moultrie, Ga., from where millions of plants grown in the open fields of south Georgia are shipped to points in the East and Middle West.

C. B. Hammond, vegetable specialist, of the New York State College of Agriculture, Cornell University, told Moultrie growers that "by next season cargo planes will be moving millions of tomato plants and air freight rates will not exceed $2.50 per 1,000 plants."

Shipment by air, Mr. Hammond remarked, will mean an extra picking since plants would arrive within a few hours and get off to an immediate start instead of going through the usual dormant period.

The FACTS Behind the Glycerine Shortage

AS everybody knows, the war and the widespread disruptions following it have caused a serious world-wide shortage of fats and oils, from which glycerine is derived.

This is the reason why enough glycerine cannot be produced at present to supply immediately all the heavy demands of the reconversion period.

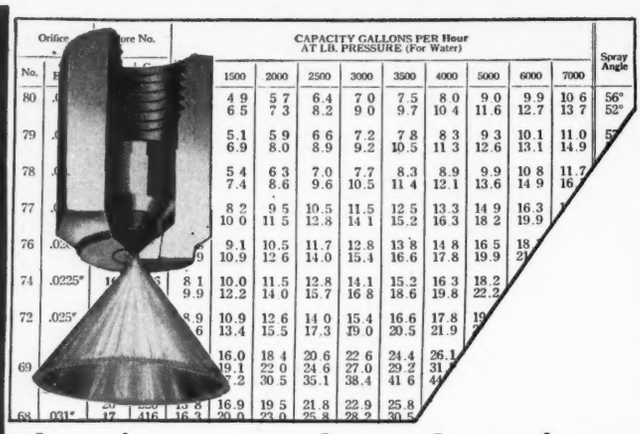
Just as bread is short because of the world-wide shortage of wheat so, temporarily, the full demand for glycerine cannot be supplied because of the shortage of fats and oils.

As this situation gradually corrects itself, glycerine will be in good supply again and fully at your service.

GLYCERINE PRODUCERS' ASSOCIATION

295 Madison Ave., New York 17, N. Y. *Research Headquarters, Chicago, Ill.*

SPRAYING SYSTEMS NOZZLES ARE AVAILABLE IN TYPES AND SIZES FOR EVERY FOOD HANDLING AND PROCESSING APPLICATION



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79			5.1	5 9	6 6	7.2	7 8	8 3	9 3	10.1	11 0
			6.9	8.0	8.9	9.2	10.5	11 3	12.6	13.1	14.9
78			5 4	6 3	7.0	7.7	8.3	8.9	9.9	10 8	11.7
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68	.031"	17	16.9	19 5	21.8	22.9	25.8				
		416	20.0	23.0	25.8	28.2	30.5				

design and selection

These SPRAY NOZZLES offer both advantages

Spraying Systems Spray Nozzles give you two big advantages (1) outstanding design for effective, uniform spray distribution and long nozzle life and (2) wide range of types and sizes to meet exactly such specifications as spray angle, atomization, and capacity. Let Catalog No. 22 prove these facts.

Write for Catalog no. 22

SPRAYING SYSTEMS CO.

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SPECIALISTS IN SPRAY NOZZLE DESIGN AND MANUFACTURE

DISTRIBUTION

Steelplate Outlook Continues Critical

OUTLOOK for tin containers is no better, even though the steel industry has resumed operation following the coal strike and put great emphasis on the production of tinplate.

Steel production rose rapidly as soon as the followers of John L. Lewis received word to return to the mines, but wartime peaks that are needed to relieve present difficulties cannot be reached because of the shortage of scrap. Spokesmen for the steel industry explain that stocks of scrap were consumed with great rapidity during the coal strike and were nearly exhausted. No new sources are in sight. A top production rate of only about 85 percent is forecast until supplies of scrap can be rebuilt, which will be a slow process.

Although every effort is to be made to supply tinplate for the food pack, there is no assurance that demands can be satisfied this year. Production of tinplate will be, to some extent, at the expense of other types of sheets.

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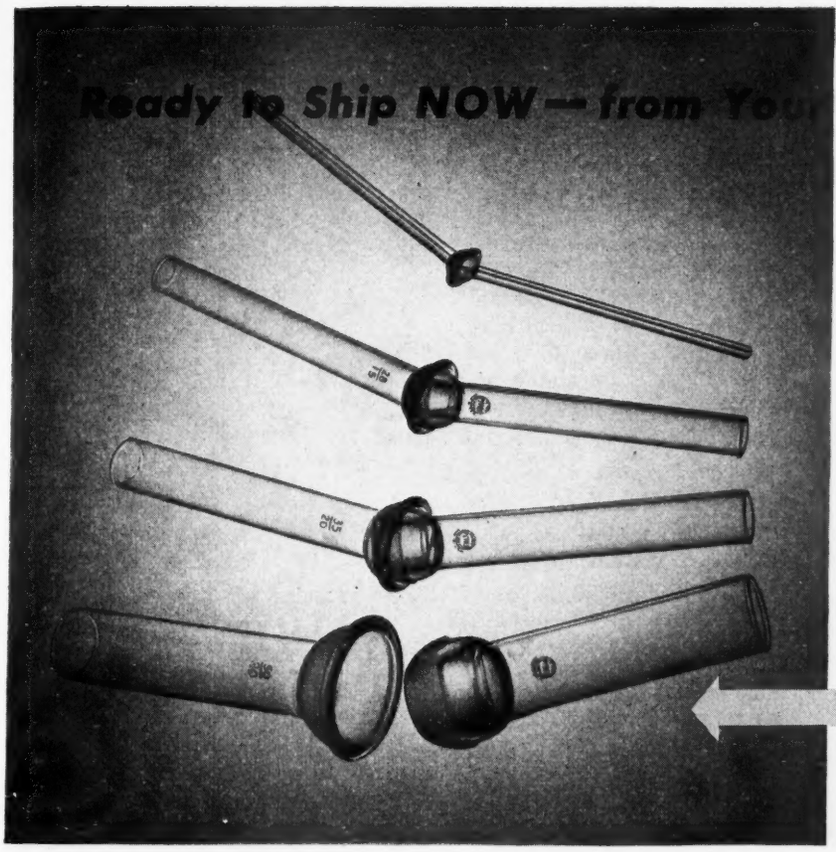
Plant and Laboratories, Bayonne, N. J.

Wide World

GEORGIA WHEAT

Tests to develop new varieties of wheat adapted to Georgia conditions have yielded a species called "Sanford," according to Dr. V. R. Gore, associate agronomist, at the Georgia Experiment Station. This wheat is said to produce one barrel of flour more per acre than the old purple straw strand. Here, Dr. Gore is seen pointing to one of the marked rows in the test field.



PYREX BRAND Ball and Socket Ground Joints

T.M. REG. PYREX U.S. PAT. OFF.

Now ample stocks of Pyrex brand Ball and Socket Joints are available in all sizes.

Improved machine operations developed by Corning have facilitated production and speeded-up delivery to laboratory supply dealers.

Pyrex Ball and Socket Joints are accurately ground, precision gauged and vacuum tested; made of Pyrex brand Chemical Glass No. 774. Completely fabricated in the Corning apparatus shop—quality workmanship is assured. All parts are interchangeable. They accommodate clamps of conventional design.

In many instances Pyrex Ball and Socket Joints may be used in place of Pyrex Standard Taper Ground Joints. The design of Standard Taper Joints does not readily lend itself to machine manufacture. Necessary hand operations limit production even though continued on a round-the-clock basis.

Pyrex brand Ball and Socket Ground Joints are described and listed on page 89 of Corning's Laboratory Glassware Catalog LP24; or consult your regular laboratory supply dealer for complete information.

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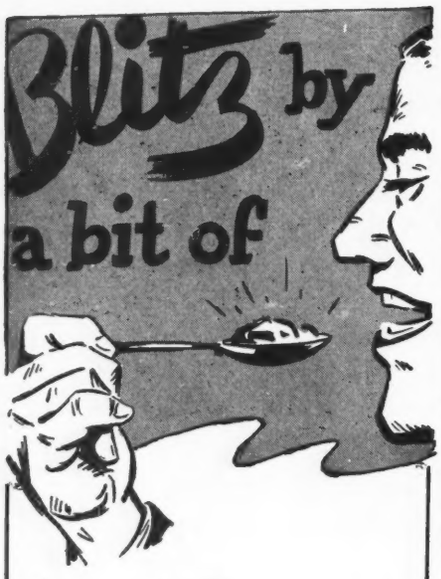

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Packing House Labor

WITH meat production running far below normal, the legitimate meat packers must soon face renewal of contracts with the Packing House Workers' Union. Advance information on the new contracts indicates that the unions will demand (1) Wage increases (2) a 40 hour week and an annual guarantee of 2,080 hours, (3) vacations of 1 week for 1 year's service and (4) a health and welfare fund of 2 percent of total wages, to be jointly administered.

The contract comes up for renewal August 11.

Tinplate Staining

DEVELOPMENT of a process which makes tinplate resistant to staining by foodstuffs is reported by the British Tin Research Institute in a review of its work from 1942 to 1944.

The review says only that the process consists of "dipping the tinplate into a hot solution of certain quite inexpensive chemicals," adding that it increases the rust resistance of the tinplate and preserves its brightness. It reports that several million cans already have been treated by the process and that at least three major commercial adaptations of the process are under way.

Texas Bread

THE size of bread loaves will not be reduced in Texas to conform with a request by the U. S. Department of Agriculture, but the amount of bread produced will be cut to meet the government's recommendation, J. E. McDonald, Texas commissioner of agriculture, has said.

Since Texas law fixes the weight of loaves at 1, 1½ and 2 lb., there is no authority to reduce the size.

SCHEDULE OF EVENTS

JULY

10-20—Indiana Canners Association, technicians school, Purdue University, Lafayette, Ind.
21-24—Southern Wholesale Confectioners' Association and Southern Salesmen's Candy Club, simultaneous conventions, McAllister and Columbus Hotels, Miami, Fla.
24-Aug. 2—New York State Experiment Station, technicians school, Geneva, N. Y.

AUGUST

12-15—International Apple Association, 52d annual convention, Sherman Hotel, Chicago.

SEPTEMBER

9-13—American Chemical Society, national chemical exposition, Coliseum, Chicago.
12-13—Cornell University, 2nd annual dairy industry conference, Ithaca, N. Y.
15-18—Southern Bakers Association, annual convention, Edgewater Gulf Hotel, Edgewater Park, Miss.
16-20—Instrument Society of America, first national conference and exhibit, William Penn Hotel, Pittsburgh, Pa.

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Changes in Food Supplies

(Indicators)

Production

Flour production, in May, was down 2,722,353 sacks from the previous month, The Northwestern Miller reports. Production, representing 71 percent of the total, was 10,948,228 sacks, which compares with 16,302,606 sacks produced in May, 1945. Production of durum wheat, during May, was 460,863 sacks, a decrease of 531,812 sacks under the output for May, 1945, and 137,892 sacks under April, 1946.

Margarine production, in 1945, reached approximately 614,000,000 lb., compared with 584,000,000 lb. in 1944. Production this year is expected to be smaller than last. Cottonseed and soybean oils accounted for 92 percent of all fats and oils used in margarine last year. The remaining 8 percent consisted of peanut, oleo and corn oil, neutral lard, etc.

Creamery butter production, in April, was the lowest on record for the month since 1922. Estimated at 91,190,000 lb., the output represents a seasonal gain of 19 percent over March. Churnings were 26 percent lower than April, 1945, and 39 percent below the five-year average for the month.

Milk production for April was estimated at 10,500,000,000 lb., only 2 percent lower than last year's record high for the month and 12 percent above the 1939-44 average.

Dry whole milk production, in April, continued to run below the corresponding months in 1945. April output is estimated at 17,265,000 lb., 25 percent under April, 1945, but 120 percent larger than the five-year April average. Dry skim milk, for animal feed, decreased 9 percent from April of last year, and was 83 percent below the five-year April average.

Materials

Green pea acreage, contracted for or planted by canners and freezers, exceeds by about 6 percent last year's all-time high planting. The total of about 529,000 acres exceeds the 1935-44 average by 40 percent.

Green lima beans will come close to a record crop if early season plans of planting about 75,000 acres are carried out. This would almost equal the 1942 acreage and also would be 40 percent higher than the 1935-44 average.

Pickle production this year, is expected to be the highest in the last 15 years, according to the National Pickle Packers Association. Their estimate of 130,000 acres planted should top the ten-year average of 9,000,000 bu. by a comfortable margin.

Chicks hatched during April totaled 340,493,000, compared with 339,469,000 in April last year. The number of eggs in incubators on May 1, however, was 26 percent less than the number on May 1, 1945, and a decrease of 63 percent in the number of chicks booked for later delivery, indicates that the hatch during the next several months will be far below last year.

In Storage

Canned peas for civilians in canners hands, May 1, totaled 1,227,000 cases, basis No. 2's, according to the National Canners Association. This compares with May 1, 1945, stocks of 409,000 cases.

Canned sweet corn civilian stocks in canners' hands May 1, equaled 1,460,000 cases, basis No. 2's., in the figures compiled by the NCA. There were 733,000 cases on hand May 1, 1945.

Canned tomato juice civilian stocks, as compiled by NCA on May 1, were equal to 1,245,000 cases, No. 2 basis. These include canned tomato juice cocktail and mixtures containing 70 percent, or more, tomato juice. There were 1,656,000 cases, May 1, 1945.

Frozen and cured fish in cold storage, May 1, totaled 92,314,000 lb., compared with 101,970,000 lb., on April 1, and 50,074,000 lb., May 1, 1945.

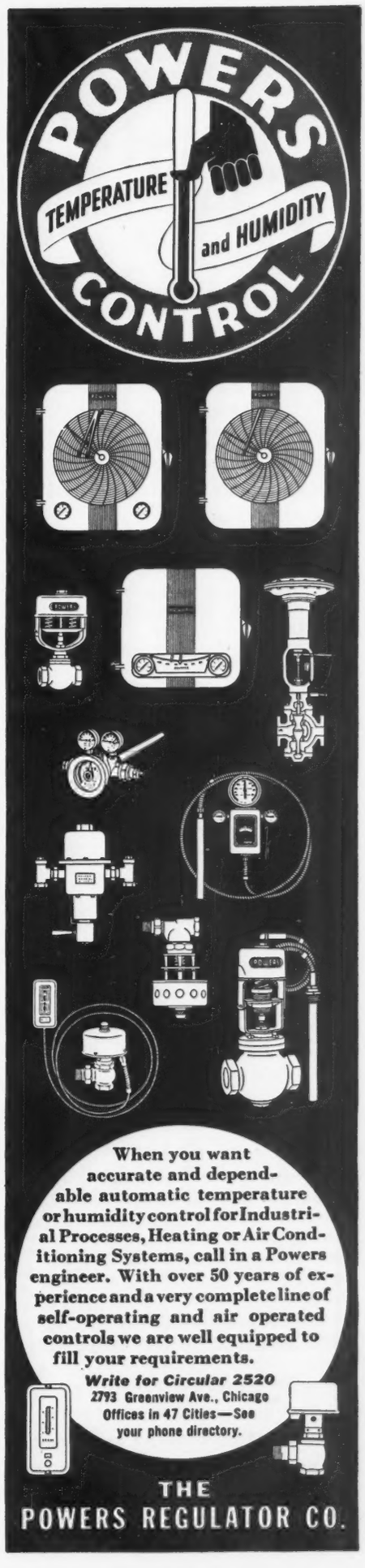
Indexes

Wholesale price of foods in the New York Journal of Commerce compilation stood at 115.8 for the week ending June 14. It was 116.2 a week earlier, and 110.0 in June, 1945.

Business Week's index on business activity reached 160.5 for the week ending June 8, which compares with 162.3 a month ago and 221.8 a year ago.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded June (thousands)	Total Awarded 1946 (thousands)
Bakery	$ 165	$ 685	$ 3,460
Beverages	250	985	19,275
Canning and Preserving	800	370	5,733
Cold Storage	1,150	58	6,276
Confectionery	650	...	1,715
Grain Mill Products	905	1,855	7,121
Ice, Manufactured	...	55	960
Meats and Meat Products	1,100	62	1,369
Milk Products	436	339	5,981
Miscellaneous	4,837	752	11,417
	$10,293	$5,161	$63,307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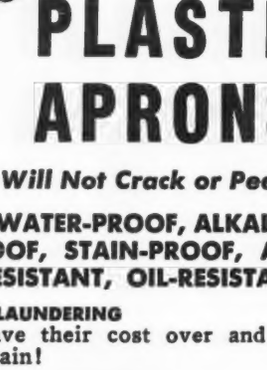
Far greater safeguard to clothing than ordinary aprons!

AMAZING STRENGTH
Plus lightness in weight for utmost wearing comfort.



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PRICES — SIZES — COLORS

WHITE—Light Weight
27 x 36..$ 6.88 per doz.
30 x 36.. 7.65 per doz.
36 x 40.. 9.35 per doz.
36 x 44.. 10.18 per doz.
Full Length Sleeves $7.15 per doz. pair

BLACK—Light Weight
30 x 36.. 9.78 per doz.
30 x 36.. 9.75 per doz.
36 x 40.. 11.90 per doz.
36 x 44.. 12.60 per doz.
Full Length Sleeves $9.66 per doz. pair
Leggings, Hip Length $11.90 per dozen pair

GRAY—Medium Weight
27 x 36..$ 8.40 per doz.
30 x 36.. 9.78 per doz.
36 x 40.. 11.90 per doz.
36 x 44.. 12.60 per doz.
Full Length Sleeves $9.66 per doz. pairs
Leggings, Hip Length $11.90 per doz. pair

MAROON—Heavy Double Coated Neoprene
27 x 36..$10.81 per doz.
30 x 36.. 12.60 per doz.
36 x 40.. 16.50 per doz.
36 x 44.. 18.74 per doz.
Full Length Sleeves $12.60 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

BLACK—Heavy Double Coated Neoprene
27 x 36..$10.81 per doz.
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Full Length Sleeves $12.60 per doz. pair
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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

ANNUAL WAGES—One of the major efforts of union leaders during future wage negotiations is likely to be a minimum annual guarantee for wage earners. This demands a new technical review of every food plant to determine how much more uniform its operations can be made. Obviously, the threat to management from such labor effort will be a minimum where the seasonal factor is also a minimum. It seems likely that much more effort must be made, at the earliest possible stage of processing, to transform perishable materials into such a condition that they can be kept for long periods. No one expects to keep green peas, fresh strawberries or even sugar beets for uniform processing through 12 months. But we have learned, from strawberries, for example, that they can be quick frozen for later processing Thus, only the labor at the first stage is necessarily highly seasonal. We may have to do that on many more commodities.

SURPLUS FEARED — Already the Secretary of Agriculture is publicly talking about department worries lest a surplus of first quality peanuts develop in the future, probably in a few years. Washington unofficially admits that peanut butter, which extensively has replaced unavailable cow butter, can not permanently hold its present position on the table, three times a day, when an abundance of butterfat returns. But with present scarcities of oil seeds and vegetable oils, it is not so easy to understand why Washington audibly worries about peanut surplus.

SALE BY WEIGHT—Ice cream dealers, of Washington, are now confronted with the threat that ice cream will have to be sold by weight if certain local officials get their way. The purpose is not to control overrun, as is often the case. The immediate cause of the present campaign is the difficulty experienced by local officials in getting convictions for "short measure" on retail sales. Clever attorneys for dealers convinced a jury recently that the local inspector did not correctly measure purchased samples. Thus, the industry has jumped itself out of the frying pan of short measure charges into the fire of threatened weight sales.

PRICE BUNGLES—Washington still believes that "one good turn deserves another." It also chuckles over the paraphrase "one bad price ceiling demands another." Favorite examples are always the ones chosen from among foods. Generally, the mess in distorted milk products relationships is the cause of this cynical comment.

NO PLEDGE—Misunderstanding of the Secretary of Agriculture was promptly forestalled when it became evident that brewers were expecting early increases in grain allocation for beer making. The department states unequivocally that increase in allocations of grain for production of alcoholic beverages during the rest of this year is very, very doubtful.

LABOR CLAIMS — Every industrial management has been threatened by long accumulated wage claims for underpayment and "damages" under the Fair Labor Standards Act. It is now expected that Congress will limit the time during which such claims may be filed to two years from the time of underpayment charged. Thus, it will not be so easy to put a small firm into bankruptcy through sudden pressing of very old claims for deficiencies in payments, especially those claimed for special overtime work.

LIMIT AND AID—Stream pollution legislation seems to be making significant progress in Congress. Certainly it will put limits on effluent from food plants into streams, if enacted. The question is whether it will give us compensating technological aid for our food factories. It will, if the cleanup of streams is sufficient to let us take into the plant cleaner, purer water than is now available. Food technologists interested in better water supply may hope for this gain, includ-

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ing protection from both industrial contaminants and sewage from upstream.

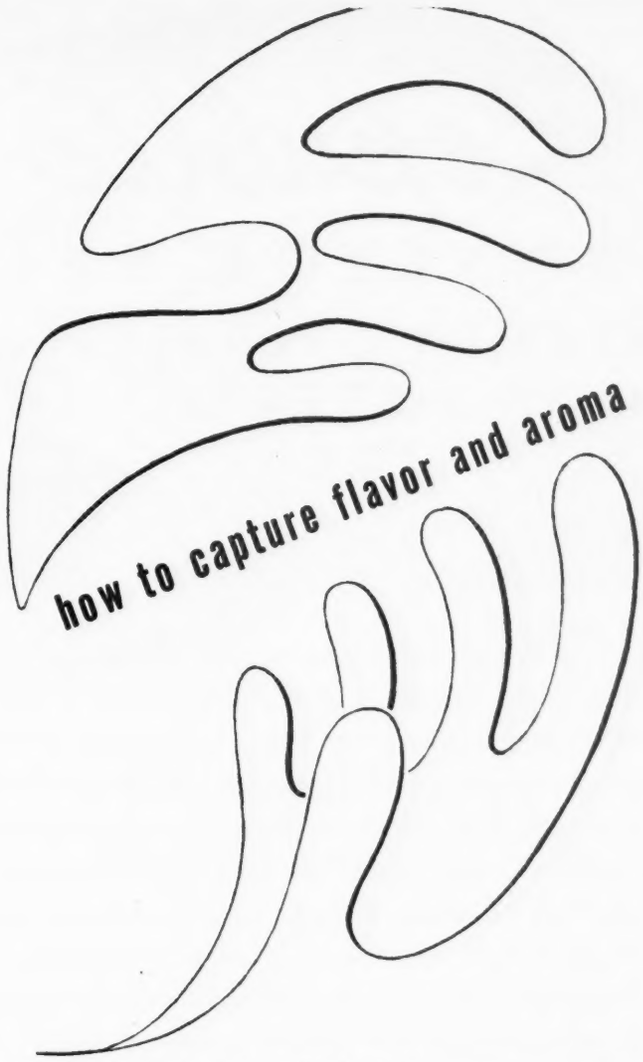
TO REGULATE REGULATORS—Both houses of Congress have passed the bill that provides for new limitations on the quasi-legislative bodies that deal with business. The purpose is to have such commissions conform with general patterns and to give the courts right of review of what might otherwise become intolerable regulation by bureaucracy. The purpose of the new bill has been well described as Congress' effort to "regulate the regulators."

FIRST OF 105—The Department of Justice has been seeking under the anti-trust laws to impose court discipline on Great Atlantic & Pacific Tea Company. This is frankly stated as the first one of a large number of cases, probably at least 105, that the Attorney General wants to bring against food companies. One of the basic issues developing appears to be whether mere bigness is badness. At one stage in the court proceedings it seems that A. & P. is called guilty because it is so big and so efficient that by passing savings on to customers it drops the prices of groceries so low as to put less efficient, smaller competitors out of business.

"INDEFINITELY"—Office of Foreign Agricultural Relations of the U. S. Department of Agriculture titled one of its late May statements "Europe's Acute Food Needs Not To Continue Indefinitely." This statement was apparently intended to be encouraging to the bread hungry public. We note that the office did not define the word "indefinitely."

COFFEE CEILING—The Department of State has asked that OPA grant a higher ceiling price on coffee. One purpose is to facilitate diplomatic discussions with Brazil. It is not known whether Secretary Byrnes will have any better luck with OPA than individual food manufacturers have had in recent years.

"EQUIPMENT DIFFICULTIES"—The order requiring that bread and rolls weigh not more than 90 percent of the standard of last March, as a measure of wheat saving, provides that "Any baker who, because of equipment difficulties, can not reasonably comply with this amendment is exempted, provided that . . . . ." Some Washington folks think that bakers will forget normal flavor and bulk-density considerations to make 14-oz. loaves fill the usual 1-lb. pans and wrappers. If that is done, the equipment difficulties to be expected will be small. But the hope of high-class bakers, who want to preserve a quality product, will certainly be that they can find some other way of meeting essential regulations than through the sacrifice of customer good will.



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ETHAVAN* recommends itself because its flavor is always uniform . . . its aroma is richer than that of Vanillin, and "stays" longer . . . it costs less than Vanillin, because it has approximately three times the flavoring strength.

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INDUSTRY

Abilene Flour Mills Co., Abilene, Kan., recently purchased the 60,000-bu. elevator of the Rodney Milling Co., Lehigh, Kan.

American Home Foods, Inc., has announced that two of its subsidiary companies have plans for construction of California plants. A Chef Boy-Ar-Dee spaghetti factory is to be built at San Jose and a G. Washington Coffee Refining Company factory will be located at Los Angeles. Start of both projects is contingent upon availability of materials.

Avoset, Inc., San Francisco, has announced plans to build a $750,000 plant at Nyssa, Ore., for the manufacture of sterile cream, casein, milk sugar, Albulac poultry food supplement and fresh dairy products.

Barr Foods, Inc., a recently organized food processing firm in Oakland, Calif., has incorporated with a capital of $500,000, and will build an $80,000 brick building on a two-acre site as its first unit. Edgar J. Barr heads the company.

Bateman Frozen Foods Co., Macon, Ga., will soon begin construction of a steel and concrete quick freezing plant, which will be used for the processing of peaches, pimientos, strawberries, sweet potatoes and lima beans.

Beatrice Creamery Co., Chicago, has changed its name to Beatrice Foods Company.

Betty Zane Corn Products Co., Marion, Ohio, recently suffered loss by fire when 3,000,000 lb. of popcorn on the cob were destroyed. It is reported that the corn did not pop.

F. E. Booth and Co., Inc., California canners, are adding $125,000 worth of improvements to their Centerville tomato cannery, which will bring capacity to 30,000 tons a year. The company's 1945 net sales, as recently revealed by President Harry H. Fair, amounted to $7,200,839, with net income after taxes, placed at $100,868.

Burry Biscuit Corp. has begun construction of a $1,000,000 plant at Myerstown, Pa., for the purpose of enlarging the corporation's flour mix and pretzel capacity.

California Packing Corp., San Francisco, expects to complete the $200,000 remodeling of the Tulare plant by September 1.

JOHN A. GREEN
The recently elected president of Pacific American Fisheries, Inc., is John A. Green, who advances from the post of executive vice-president. The company, headquarters of which are in Bellingham, Wash., cans salmon in Alaska and on the Puget Sound.

Churngold Corp., Cincinnati, Ohio, has purchased the canning plants at Waynesville and Roxanna, Ohio, from the Roxanna Canneries Company. Announcement was made by Samuel Blakemore, head of Churngold.

Custom Food Products, Inc., has been formed in Chicago to manufacture specialty ingredients, seasonings and flavor-fixing agents for institutional uses and other food processors. Principals are W. E. Kicker, A. R. Goodson, James W. Jones, W. Gould Jones and Roy L. Storck.

The Desert Citrus Growers Corp. has been formed at Phoenix, Ariz., for the production of fresh orange juice. The firm plans year round production of fresh orange juice by homogenized processing, and distribution by truck in retail-size containers throughout Arizona.

Griffith Laboratories, Inc., Chicago, manufacturer of flavoring extracts and allied products, is building a branch plant at Los Angeles.

The Litchfield Creamery Co., Winona Lake, Ind., is building a $300,000 brick addition to its plant.

Mayfair Food Products Co. has moved to its new pickle packing plant at Arlington Heights, Ill.

Old World Foods, Inc., Los Angeles manufacturer of salad dressings, specialty vinegars and sauces, is constructing a new plant at Palestine, Texas, according to Richard Barrett, president.

Pomona Products Co. is constructing a $200,000 addition to its Griffin, Ga., plant. The company is planning a new line of products to fill the gap between the end of the pimiento season and the start of the turnip greens. It is expected that dry-pack items will be added, although experiments will be made in the canning of Irish potatoes. It is also announced that the organization will move its citrus operations from Winter Haven to Clermont, Fla.

The Quaker Oats Co., Ken-L Products division, has purchased the long-idle plant of the Marion Packing Co., Marion, Ohio, and plans to spend $500,000 in modernization and equipment. The plant will manufacture dog foods and export canned meats to foreign countries.

The Southwestern Nut & Oil Co., Tulsa, Okla., has begun production of peanut butter and a cake and pastry filler to be called Whip-O-Lyte. Noel Eden is general manager of the company.

St. Marys Packing Company's plants in Holgate and Leipzig, Ohio, have been sold to Libby, McNeill & Libby, Chicago. Joseph Reynolds will remain as Holgate manager and a general superintendent will be named to direct both plants.

Utah Canning Co. has purchased a 51 percent interest in the Pendleton Canning and Frozen Foods Co., Pendleton, Ore.

PERSONNEL

Frank A. Buese, formerly in charge of industrial relations and industrial engineering for E. J. Brach & Sons, Chicago, is now production manager of Queen Anne Candy Co., Hammond, Ind.

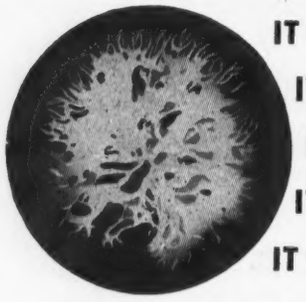
F. M. Bundy is the new president of Gorton-Pew Fisheries, Gloucester, Mass. He is also secretary of the National Fisheries Institute.

Gordon H. Clark has been appointed general manager of the International Milling Company's Buffalo plant, succeeding John J. Kovarik, who has retired. Mr. Clark formerly was production manager of the Buffalo mill.

David R. Corbett, recently returned from the Navy, has been made treasurer of the Curtiss Candy Co., succeeding the late William C. Moller. C. How-

Something New Under the Sun

. . . A UNIVERSAL COLLOID AGENT



IT THICKENS . . .
IT GELS . . .
IT EMULSIFIES . . .
IT STABILIZES . . .
IT SUSPENDS . . .

We are now producing from Carragheen two new improved types of gelose. One of them should be the answer to your emulsifying, suspending, thickening or stabilizing problems.

KRIM-KO GEL is an all-purpose colloid-assistant. Properly used, it has been proved effective in many of the most exacting food, pharmaceutical and industrial applications.

CARRAGAR is an agar-type gelatin which forms tender, fruit-like gels over a wide pH range. It does not require acidulation to produce desired results.

Send for free liberal working samples for experimental use.

KRIM-KO Company
SEAPLANT PRODUCTS DIVISION
SCITUATE, MASS.

For The Man Who Must Know About PUMPS!

If it is your job to see to it that the right pump is used for the pumping problem at hand, be sure you have the latest information on Viking Rotary Pumps.

These pumps are self priming; capable of delivering against discharge pressures up to 200 pounds per square inch; smooth, even flow with no pulsation; operate at slow speed for long, dependable life; only two moving "gear within a gear" parts assure low cost operation and service.

If your problem is pumping any liquid or semi-liquid food product, send for free bulletin 103E today. It will help you in making the right selection.

See Our Catalog In SWEETS

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

ard Bent, assistant to Mr. Moller for several years, has been promoted to assistant treasurer of the company.

Henri H. Dutz, former consultant to the Office of the Quartermaster General, Washington, has taken over the management of the experimental kitchen of Meta Given, home economics specialist, Chicago. Miss Given will continue to devote part of her time to the kitchen.

Dr. Martin I. J. Griffin has been made assistant to the president of the P. J. Ritter Co., Bridgeton, N. J. Dr. Griffin, recently discharged from the Army, will assist in coordinating company activities and will be particularly concerned with general supervision of special public and industrial relations problems.

William H. Hottinger, Jr., of Bowey's, Inc., Chicago, recently was re-elected president of the National Association of Manufacturers of Fruit and Flavoring Sirups.

Glenn E. Knaub, assistant to the director of the U. S. Department of Agriculture's fruit and vegetable branch, has resigned to become assistant to the president of the Venice-Maid Co., Inc., Vineland, N. J., manufacturer of tomato products and spaghetti.

Robert B. Law has been appointed director of production planning for Chef Boy-Ar-Dee Quality Foods, Inc., Milton, Pa., division of American Home Foods, Inc.

Paige Lehman, former general mill superintendent for Pillsbury Mills, Inc., Minneapolis, has been elected vice-president in charge of manufacturing, succeeding M. A. Lehman, who will continue as a director of the company.

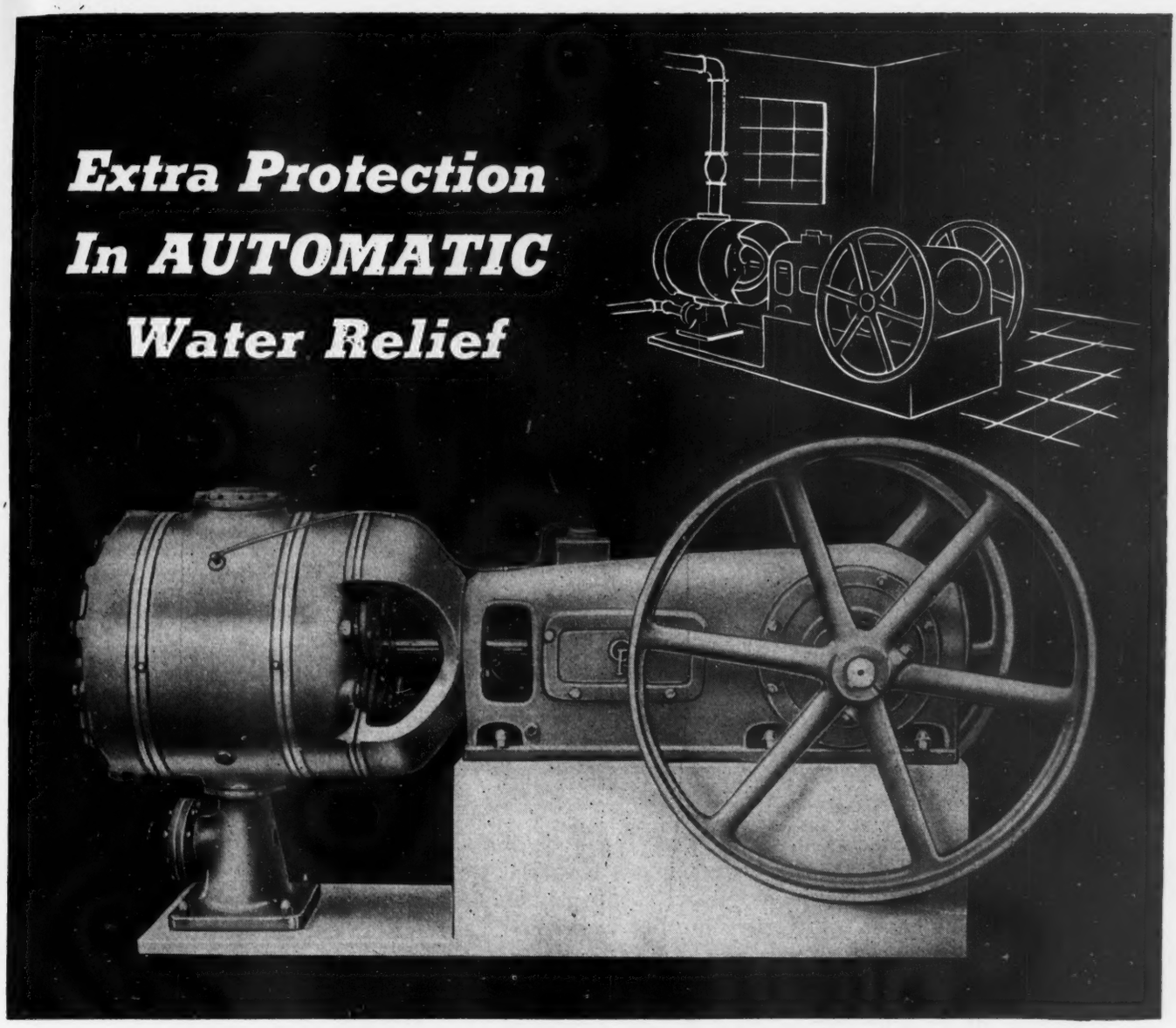
C. M. McMillan has resigned as secretary of Southern Bakers Association, and will go to Washington, D. C., as executive secretary-treasurer of the newly formed National Candy Wholesalers Association, Inc.

M. J. Metzger, Bowman Dairy Co., and **Paul Young,** Golden State Co., Ltd., have been elected to the board of directors of the American Dry Milk Institute, Inc., Chicago.

Sterling Morton, vice-president of Morton Salt Co., Chicago, has been elected chairman of the board of the company.

Richard D. Muzzy, vice-president of the Daggett Chocolate Co., Cambridge, Mass., has been elected president of the New England Manufacturing Confectioners Association.

Milton Neuer has been named plant manager of the Buffalo bakery of the Great Atlantic and Pacific Tea Co., succeeding Percy H. Trevillian, who has been promoted to a divisional bak-



CP SINGLE AND DUPLEX DRY VACUUM PUMPS

ONE of the discharge assemblies in each end of the cylinder of a CP Horizontal Vacuum Pump is arranged as a special automatic valve. Should a slug of liquid be accidentally drawn into the cylinder the relief valve assembly will lift off its seat against a heavy spring, providing extra escape area for the liquid and minimizing the danger of damage to the pump. This is an exclusive CP feature.

The durable Simplate Valves are located in both cylinder heads parallel to the piston face, affording low valve clearance and high volumetric efficiency at high vacua.

Arranged for belt, motor or steam drive, CP Horizontal Single and Duplex Dry Vacuum Pumps are available in capacities up to 15,000 c.f.m. Two-stage pumps available for very high vacua. Write for complete information.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL CP COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

ONE OPERATOR can produce 25 to 30 gallons of a perfect end product every five minutes with the modern Case Emulsifier-Homogenizer... 360 gallons an hour! The entire process is controlled by manual valves and a switch button.

Not only does the Case unit save time and labor, but because of its scientifically designed and simplified emulsifying-homogenizing devices, it produces a product of definitely uniform dispersion—velvety smoothness of body. Case emulsified products have a pronounced firmness and high stability that resist the hazards of transportation, handling, storage and shelf-life.

Use the Case Emulsifier-Homogenizer in the processing of all foods which require wetting, blending, digesting, mixing, dispersing, emulsifying and / or homogenizing.

Write today for literature, or for a demonstration in your own plant. Case field engineers are available anywhere in the United States.

A. T. CASE CO.
1516 S. CALIFORNIA AVE.
MONROVIA, CALIFORNIA

CASE
EMULSIFIER - HOMOGENIZER

ery superintendent, with headquarters in New York.

Walker Penfield has been appointed manager of manufacturing for the Pennsylvania Salt Manufacturing Co.

Col. Albanus Phillips, one of the founders and for the last 44 years head of Phillips Packing Co., Inc., Cambridge, Md., has resigned as president and now becomes chairman of the board of directors. His successor is his son, Albanus Phillips, Jr., who has been active in the organization's operation and supervision for more than 25 years.

DEATHS

Franklin D. Baker, Jr., 73, one of the founders of the Franklin Baker Coconut Co., New York, recently.

Douglas Lee Boyer, 55, assistant general manager of sales, Monsanto Chemical Co., June 3, in Chicago.

Irma Burney, 87, founder of Burney Bros. Bakeries, Chicago, May 20.

Albert G. Burnham, 61, manager of the Morrison, Ill., plant of Libby, McNeill and Libby, recently.

Wallace T. Jones, 56, president of Rockwood and Co., Brooklyn, May 28.

Roy H. Crane, 51, sales promotion manager, Liquid Carbonic Corp., Chicago, recently.

Edgar L. Feininger, 56, assistant general manager of the chemical department of General Electric Co., Pittsfield, Mass., recently.

Henry F. Fortmann, 89, for 33 years president of the Alaska Packers Association, San Francisco, and an organizer of the Pacific Fisheries Association, May 21.

John N. Fulham, 61, owner of Haskins Fish Co., and president of the Boston Fish Market Corp., May 3, at Wellesley, Mass.

George A. Hormel, 85, founder of the Hormel Packing Co., Austin, Minn., June 5.

Mathew A. Luebbers, 64, supervisor for Kraft Foods Co., Chicago, May 19.

Charles E. McManus, chairman of the board of Crown Cork and Seal Co. Inc., June 3, in New York.

Whitman E. Rice, 67, retired chemist for the National Sugar Refining Co., New York, recently.

Cedric R. Richmond, 56, head of the frozen food and vegetable production department of the Richmond-Chase Co., San Jose, Calif., May 8.

EXTRA STRENGTH with LESS WEIGHT!

TRAILMOBILE New Streamlined Tanker has Striking Internal Reinforcement!

SPECIAL FEATURES

Tubular axles (demanded 2 to 1).
"Horizontal," rubber-bushed radius rods.
Adjustable upper fifth-wheel plate.
"Fastest" unloading drainage.
"Slam latch" fill-plug domes.
Heavy-duty channel bumper.
Full-length hose-tubes.
Sturdy reinforced bulkheads.
Special safety features, including fuse plugs and safety valves, throughout.
Many others!

ALSO SUPPLIED WITH TRAILMOBILE'S SIMPLIFIED TANDEM—WITH ONLY 2 POINTS FOR LUBRICATION!

Here is a tanker that is lighter, stronger, and the "easiest pulling" in the industry. This means that payloads are increased. Vibration is minimized. Maintenance is reduced. Hauling is faster, easier. And tanker-operation is far more profitable.

We did it by eliminating all the excess weight of "outside" supporting-structures. And then adding special 3-way reinforcement to every baffle, 'head and the end-sheets; in addition to special bolstering throughout "inside" the tank. So the tank itself supports the load, distributing shocks and stresses throughout "every inch" of the trailer. Every member, even the shell, bears its *full share* of the load.

Moreover, this tanker has many other advantages. Due to a repositioning of the sumps and to special costlier elbows, unloading drainage is faster. And overflow drains from the solid catwalk down one ladder-upright. With oval nose, trim skirting, sloping rear, and overall redesign, it's a beauty. See it, at your Trailmobile Branch.

THE TRAILMOBILE COMPANY
Cincinnati 9, Ohio

TRAILMOBILE

Protecting its 105 Year Reputation

—71 "Homefolks" Service Centers

PROTECTION + SALES APPEAL
for
FOOD PRODUCT PACKAGING

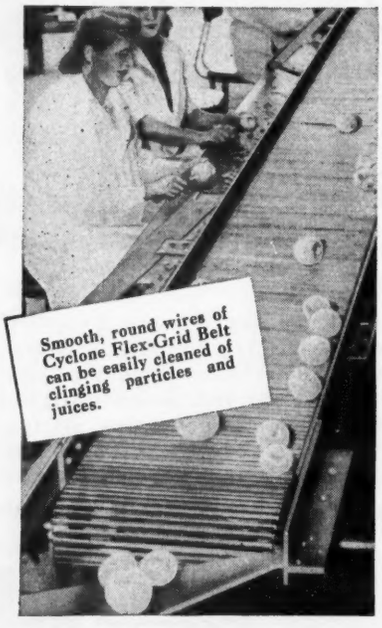
Shippers of packaged foods find in Hummel & Downing Company's integrated production and customer services the answer to most of their problems in selection of the best folding or display cartons and shipping cases. We take entire responsibility for the package from the boxboard to printing the finished carton.

HUMMEL & DOWNING COMPANY
MILWAUKEE 1, WISCONSIN

Waste Paper is a Vital Raw Material . . . SAVE IT . . .

FLEX-GRID . . . a special Cyclone belt for food processing

CYCLONE Flex-Grid Metal Conveyor Belts are ideal for the continuous processing of baked goods and of such frozen foods as apples, peaches and apricots. Where turntable operations are desired, Cyclone Multi-Pitch Flex-Grid Belt can be adapted to a complete circular return or less, as needed. Cyclone also makes Chain Link and Flat Wire Conveyor Belts. One of the three types may be just right for your particular operations. Our experienced engineers will be glad to help you decide. Offices in principal cities . . . factories in Middle West and on Pacific Coast. Write for catalog No. 3. No obligation.



CYCLONE FENCE DIVISION · American Steel & Wire Co. · USS CYCLONE "Red Tag" METAL BELTS · UNITED STATES STEEL

By the makers of Cyclone Fence
CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Dept. H-76, Waukegan, Illinois
United States Steel Export Company, New York

UNITED STATES STEEL

ASSOCIATED INDUSTRIES

Victor W. Buhr Associates has established a consulting office in Salisbury, Md., to engage in engineering design and supervision of industrial operations. Before his war service, both in Europe and the Pacific, Mr. Buhr was vice-president in charge of design and contracts for the Equity Construction Co.

Celanese Corporation of America has appointed Kenneth D. Bowen, plant manager of the company's chemical plant at Bishop, Tex. Mr. Bowen was formerly plant manager of the Dow Chemical Company's styrene plant at Velasco, Texas.

Continental Can Co. has appointed John Jennings southeastern district manager of paper container sales. His territory will include North and South Carolina, Georgia, Florida, Mississippi, Louisiana, Alabama, and parts of bordering states. His headquarters will be in Atlanta.

International Plastic Corp., Morristown, N. J., has made Thomas F. Plummer production manager. Mr. Plummer was formerly with DuPont Cellophane Co., and the H. B. Catty Corp., Norwalk, Conn.

Owens-Illinois Glass Co. has purchased a building in Toledo, Ohio, to be used as a development and research laboratory. The company also bought 100 acres of land in suburban Toledo, which will be used experimentally for model farming and canning development.

Reynolds Metals Co. has arranged for a $12,500,000 loan from a banking syndicate, headed by the Bank of the Manhattan Company. The funds will be used to finance enlarged operations for the Reynolds Co., and to provide additional working capital for the company's operation of government-owned aluminum plants, which it recently leased. The most important of these plants are at Hurricane Creek, Ark., Troutdale, Ore., Jones Mills, Ark., and McCook, Ill. The loan is for a term of six years and is payable in five equal installments, beginning 1948.

Robert F. Schnier has rejoined I. F. Schnier Co. as a member of the sales staff. He will work with closure specialists of the company on applications of Armstrong and duPont closures and packaging materials.

Wickwire Spencer Steel has appointed D. A. Sutch general superintendent of the Clinton, Mass. plant. He succeeds G. G. Lloyd, who was recently transferred to the Buffalo plant as general superintendent.

"The bigger the family—the better the service"

CONTINENTAL CAN COMPANY, INC.

PAPER DIVISION Headquarters
330 W. 42d St., New York 18, N. Y.

COMBINATION PAPER AND METAL CONTAINERS

LIQUID-TIGHT FOOD CONTAINERS

MONO PAPER CUPS

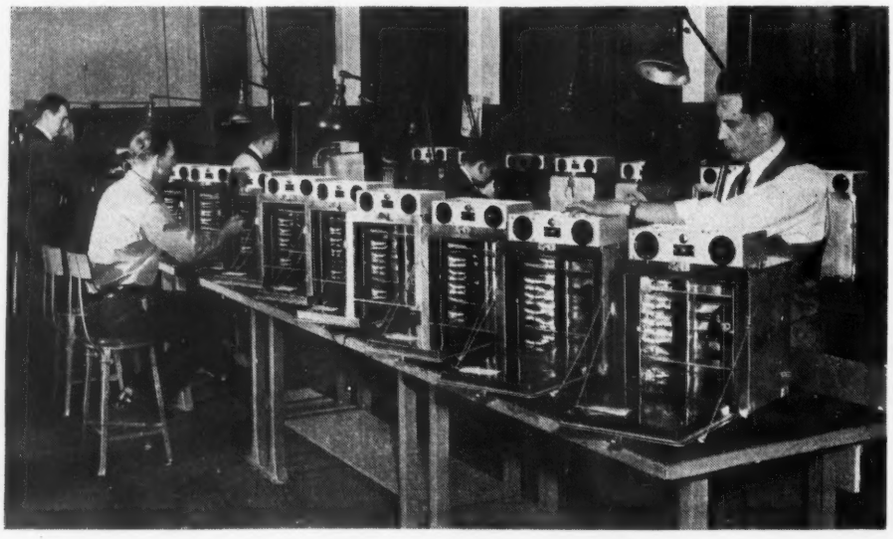
FIBRE DRUMS The Container Co., Van Wert, Ohio

Sales offices in all principal cities

CONTINENTAL PAPER DIVISION

AND CONTINENTAL is a big family—growing bigger—manufacturing many different kinds of paper packages for food and dairy products . . . liquid-tight containers, cups, fibre cans and drums . . . all in a wide variety of types and sizes. Wherever you see the Continental Triple-C trade mark on a paper container—you know you're getting the best in *quality*, best in *service*.

FOOD EQUIPMENT NEWS



Electric ovens for serving precooked frozen meals.

Frozen Meal Ovens

W. L. MAXON CORP., Dept. I, Norwich, Conn., announces Whirlwind electric ovens to be used on planes for the 15-minute thawing operation of frozen meals and their final cooking for service. These ovens are presently being supplied to the Pan American World Airways and planes of the Naval Air Transport Service. The partially precooked meals are supplied by the Maxson Food Systems, Inc.

These lightweight ovens are made of aluminum and stainless steel and are installed singly or in pairs. Each has six tiers for the quick cooking of that many meals. Heat is distributed evenly by a fan in the rear of the compartment.

Gravity Conveyor

DESIGNED to fill the need for a medium-duty conveyor, the Rapids Standard Co. Inc., Dept. I, 342 Peoples National Bank Bldg., Grand Rapids 2, Mich., announces the addition to its line of the "Rapid-Roller" gravity conveyor.

It is made to handle anything with one firm, free-running surface with at least 9 in. of smooth area. Standard frame lengths of 5 and 10 ft., and two standard widths of 12 and 18 in, are made. The conveyor rollers are 2 in. in diameter projecting ⅜ in. above the conveyor frame level. They are mounted on free-running single-row radial ball bearings at each end. Each roller is secured to the conveyor frame by a bolt-and-nut type, high carbon steel axle.

The new inner design of the roller includes a steel tube spanner bushing with hexagon-shaped ends that houses the roller axle and locks the inner race of the bearing to prevent its turning while rollers are rotating. This permits simple removal of the axle itself from the conveyor frame when changing spacing of rollers.

Rollers are spaced at 3 in. intervals, but sections can be obtained in spacings of 6, 9, 12 inches or any other multiple of the number three. Standard Q-Series adjustable supports are adaptable. Actual tests show that with at least three rollers supporting the weight of the material load at all times and with the conveyor section supported at both ends, the maximum capacity is 80 to 100 lb. per ft. of distributed load, or 800 to 1,000 lb. per 10 ft. section.

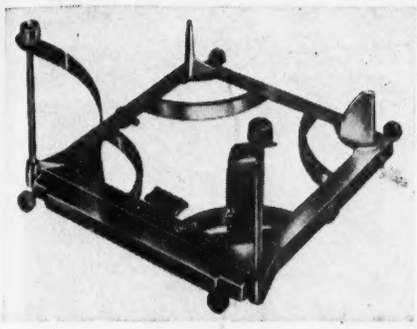
Fluorescent Lamps

As a result of more than two years of research and testing of new phosphorescent coatings and lighting performance, two lamps, designated as (4500°) 40-watt T12 and 100-watt T17, have been announced by Sylvania Electric Products, Inc., Dept. I, Salem, Mass.

4,500 deg. white fluorescent lamps.

Initial ratings are 50 lumens per watt for the 40-watt size and 40 lumens per watt for the 100-watt size. They are interchangeable with fluorescent lamps of the same wattage ratings now used in existing fixtures and will be distributed through regular channels.

Medium-duty gravity conveyor.



Container holder.

Container Holder

To keep ice cream containers from turning or slipping, Budd H. Johnson Products Co., Dept. I, San Diego, Calif., has developed a simply designed holder for these cans for use while the cream is being removed. The principal feature of the design is the special steel spring clamps whose tension is easily adjusted by thumb screws. When the clamps are once set, the ice cream container can be dropped into the holder, where it is locked automatically. To remove the empty container, simply lift it out. While especially designed for ice cream containers, the device will hold any comparable container while the contents are being worked on. It accommodates either 2½- or 5-gal. containers.

Vibratory Screening

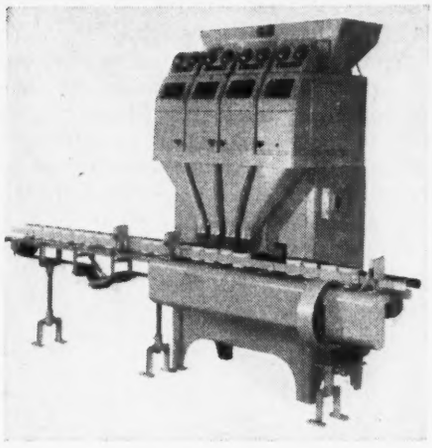
A LARGE capacity, heavy duty vibratory screening feeder has been added to their line by the Syntron Co., Dept. I, 111 Lexington, Homer City, Pa. An important advantage gained by the type of construction used is that of having the pulsating magnet forward and above the grizzly deck. The actual conveying or feeding is restricted to oversize material, the bulk of the fines being vibrated through at the rear of the trough upon introduction to the feeder.

This is known as Model F-45 and is said to have an actual conveying capacity of 200 tons per hour. For separation purposes, this capacity is cut down to meet the percentage of fines discharge required by the user.

The vibratory action of Syntron feeders is said to be particularly adaptable to separation operations. While not perceptible to the eye, its movement or stroke is actually "upward, forward and back," momentarily leaving the material suspended, then repeating this movement 3,600 times per minute. Thus, some impact is occasioned between the material and the grizzly bars which, while slight, is of sufficient force to tumble the material and hasten separation.

Coffee Packaging Machine

DESIGNED for fully automatic weighing, filling and shaking of ground coffee into 1-lb. cans at a rate of 60 per minute the Triangle Package Machinery Co., Dept. I, 906 N. Spaulding Ave., Chicago 51, Ill. announces an improved version of the "Elec-Tri-Pak Weigher." Coffee is fed into a hopper on top of the machine from which it travels into electrically vibrated feed trays. There are two of these trays, or troughs, in each of the four sections of the machine. One tray is for bulk feed, the second for dribble or finishing feed. These trays discharge into power-rotated weighing receptacles which in turn discharge into the coffee cans. Power-rotated receptacles are a new feature, which provide faster, more positive operation.



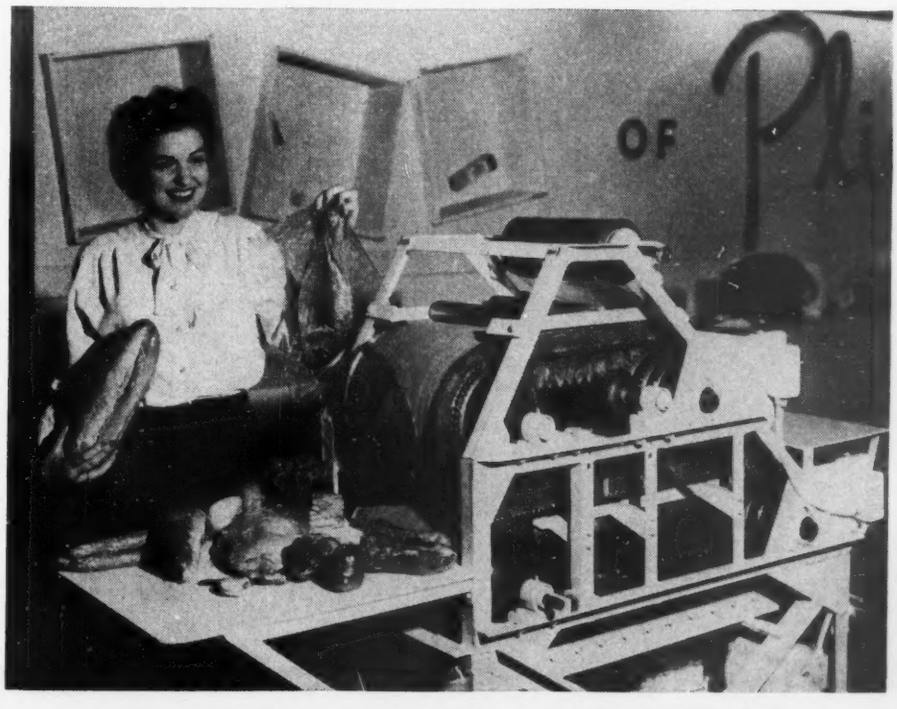
Coffee packaging machine.

The sequence of operation is as follows: (1) Cans are automatically conveyed from the left to position under the four discharge spouts, (2) the two parallel trays in each section immediately start to discharge coffee into the weighing receptacles, (3) when nearly full weight is reached, the bulk feed tray stops and the finishing feed brings the load to exact weight and (4) when exact weight is reached, the finishing feed stops, the weighed load is dumped into the container, the cans move to the right and the cycle begins again. All four sections of the machine operate simultaneously, thus filling four cans at a time.

A no-can, no-fill control makes this machine completely automatic and foolproof. If the vacuum closing machine jams or the supply of empty cans to the weigher fails, the machine automatically stops. Coffee is settled well down into the cans by an automatic bar shaker, which operates during the filling operation. Acro-meter control on the front of the machine permits changing weights without having to stop the machine.

Wrapping Machine

CAPABLE of high speed wrapping of irregular articles of varying sizes in transparent, moisture-proof Pliofilm is a packaging machine developed by the Goodyear Tire & Rubber Co., Dept. I, Akron, Ohio. The machine will package such irregular items as fish, chops, chickens, fruits and vegetables.

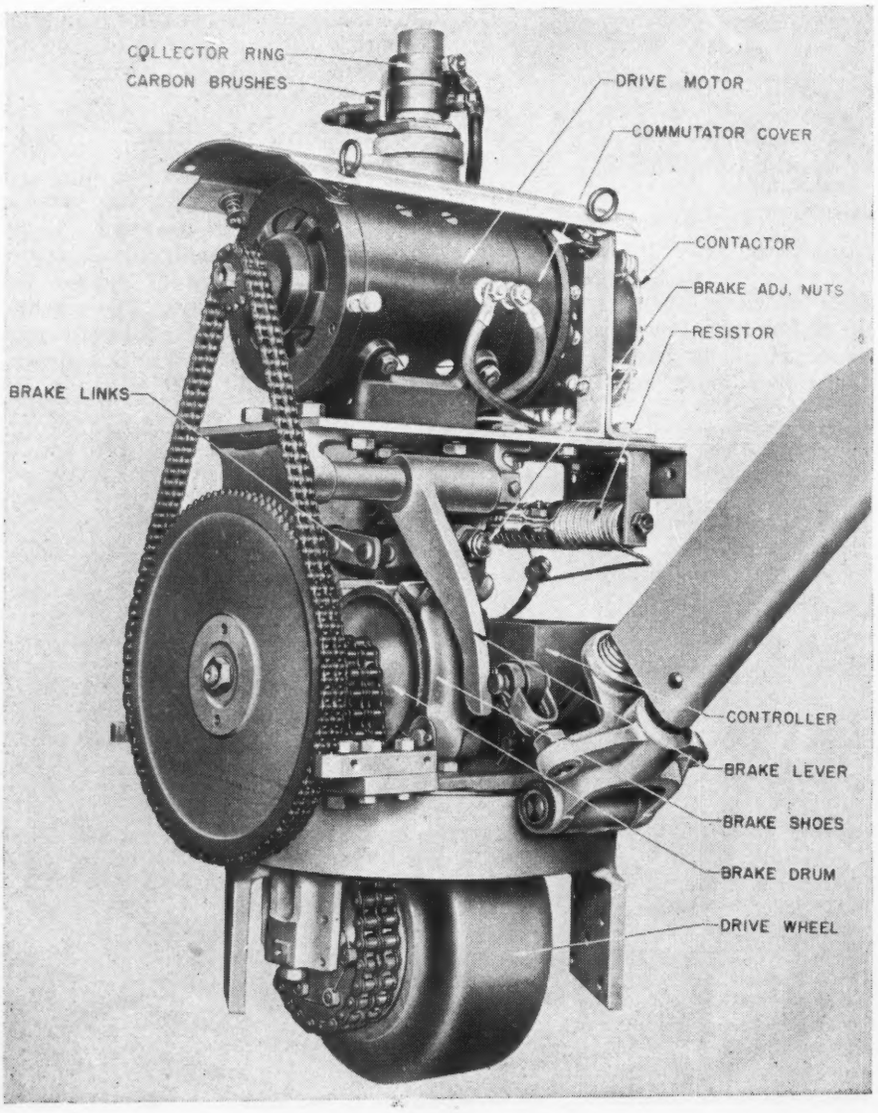


Packaging machine for wrapping articles of irregular shapes and sizes.

Electric Hand Truck

REDESIGNED driving unit for new model electric hand truck is announced by Automatic Transportation Co., Dept. I, 101 W. 87th St., Chicago, Ill. Major modifications include both redesign of component parts and also their relocation to permit ease of access.

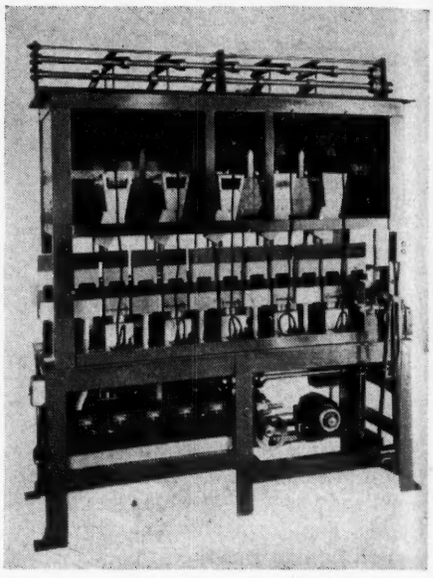
Commutator-type collector ring has carbon brushes replacing the former copper fingers, eliminating need for lubrication. Terminals are reduced from six to four and relocated to prevent obstruction of other elements. Contactor is more accessible for inspection and the mounting is simplified and strengthened. The resistor has been relocated to permit full access to motor, with wiring redesigned for simplification. The brake, which is applied automatically by the release of the guide handle, is designed to bring the truck to an immediate stop even on grades up to 10 percent. The drum is increased from 4 in. to 5½ in. in diameter. The actuating lever, with 3-to-1 leverage ratio, raises the brake links and pulls the brake shoes together, exerting from four to five times greater pressure per pound of effort on the handle than the former brake.



The "heart" of redesigned electric hand truck.

Automatic Weight Adjuster

OPERATING automatically at high speed, the automatic weight adjuster announced by Fred Goat Co., Inc., Dept. I, 314 Dean St., Brooklyn, N. Y., receives partially filled packages from volumetric or rough weight filler and adds sufficient material to bring the packages up to the desired gross weight. Traveling through the machine on a conveyor in timed cycles, the packages pass through a series of stations at each of which progressively smaller increments of material are added as required, until the package is brought up to the desired final weight. Material is added at each station only if the weight of the package upon reaching that station is below the present weight limit of that station. The machine illustrated handles 60 one-lb. packages per minute and is said to be fully automatic, requiring no operator and utilizing only ⅓ hp. motor.



Automatic weight adjuster.

Roof Paint

AN aluminum roof paint that forms a reflecting, protective covering, said to reduce inside temperatures by as much as 15 deg., is announced by United Gilsonite Laboratories, Dept. I, Scranton, Pa. The paint is processed from a high quality gilsonite asphalt base and fortified with a specially processed pure aluminum paste. When the paint is applied, the aluminum pigment "leafs" to the surface to form a foil-like, metallic shield against the elements.

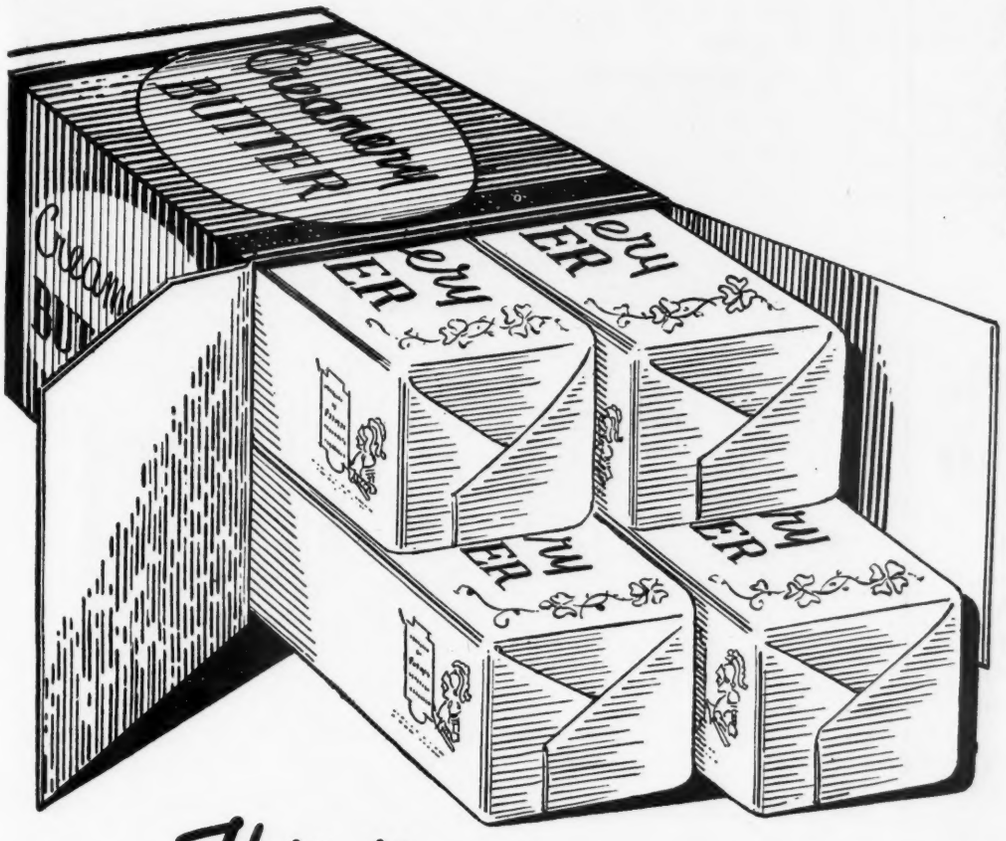
Sanitizing Agent

NON-IRRITATING, nontoxic "SP-25," manufactured by the Sethness Products Co., Dept. I, 254 E. Erie St., Chicago, Ill., has been developed to meet the need for a disinfectant with increased potency, yet entirely harmless to users, their clothing, and metals. It is a tasteless, odorless sanitizing agent that gives a detergent action at either high or low temperatures. One ounce of the chemical in 4 gal. of water provides an effective and stable disinfectant.

At 1 to 5,000 dilution, 99.5 percent kill is obtained in one minute or less on such bacteria as *Staphylococcus aureus*. It is particularly applicable in the washing of food containers, and in food processing and bottling plants.

Use Patapar for:

Food wrappers
Milk can gaskets
Bottle hoods
Pie doilies
Box and crate liners
Bulk packaging units
Can liners
Vitamin capsule trays
Deep freeze wraps
and hundreds
of other uses



This is your keymark

Protected by Patapar Vegetable Parchment

The Patapar keymark is the nationally advertised symbol of wrapper protection. It was designed to be used on your printed Patapar wrappers as a way to tell customers your product is well protected. We'll include the keymark on your printed Patapar at no extra cost.

. . . with Patapar you get complete wrapper printing service

Patapar* Vegetable Parchment can be beautifully printed in bright colors and designs. We do the printing for you in our own plants which are completely equipped for printing Patapar by letterpress or offset lithography. We'll print your Patapar in one color or several colors. We'll create designs for you, make sketches, suggest color combinations. We'll take care of every detail right up to the delivered job.

And remember, when you use Patapar you are using the best protective wrapper money can buy. It's got wet-strength. It's boil-proof, grease-resisting, odorless, tasteless.

*Reg. U. S. Pat. Off.

Paterson Parchment Paper Company • Bristol, Pennsylvania

Headquarters for Vegetable Parchment Since 1885

WEST COAST PLANT: 340 BRYANT STREET, SAN FRANCISCO 7, CALIFORNIA
BRANCH OFFICES: 120 BROADWAY, NEW YORK 5, N. Y. • 111 WEST WASHINGTON ST., CHICAGO 2, ILL.

GLOBE WOVEN BELTS

You Can— and We Can—

with GLOBE KANRY-TEX

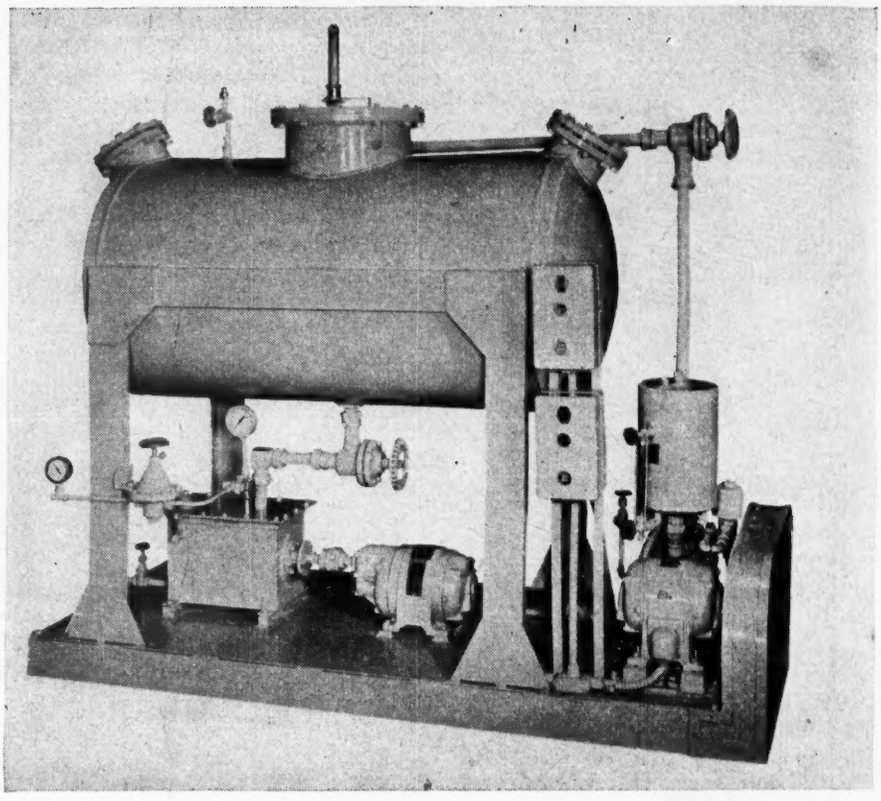
If canning and food processing is your business, you're busy right now. And you are particularly anxious to have economical, non-stop operation in your plant.

We can go a long way toward helping you have just such smooth and satisfactory processing — Globe Kanry-Tex is the reason. Kanry-Tex is strong and durable. Kanry-Tex resists fruit and vegetable juices and acids.

And to you in this important industry, Kanry-Tex has other valuable features. It does not impart odor or taste. It always keeps a clean, sanitary appearance with minimum care.

Your mill supply house has all the facts on Globe Kanry-Tex. Why not contact them RIGHT NOW (or us direct) and find out about this outstanding belting?

GLOBE WOVEN BELTING CO.
1403 CLINTON ST.
BUFFALO 6, N. Y.



Storage tank keeps dehydrated oil dry.

Oil Vacuum Storage Tank

To remove all moisture, whether free or in solution, from various kinds of oils, and to store them under sufficient vacuum to prevent the reentry of moisture, Buckeye Laboratories Corp., Dept. I, 7016 Euclid Ave., Cleveland 3, Ohio, offers a storage tank that stores oil under a 5-micron vacuum. Originally designed for refrigerator oil, this tank is suitable for other types such as insulating, lubricating, or tung oil.

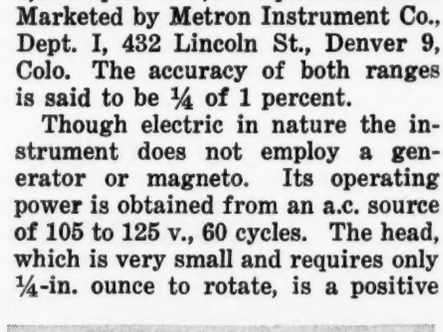
Automatic Bottle Washer

FULLY AUTOMATIC, high speed glass bottle washing is said to be achieved by new pocket washer manufactured by Hartford Empire Co., Dept. I, Hartford 1, Conn. It has a worm feed which picks up and properly spaces jars. A series of spring fingers protects containers entering the first flight of this worm, giving way if any jam occurs and thus avoids bruising or crushing the glassware. From the worm the containers go into a star wheel which feeds them to the chain pockets. As the pockets pass around a sprocket, the containers are inverted. Entrapped debris drops out. Containers can be preheated, then washed and drained or blown out at this point. They are then re-inverted as they pass around a second pocket and are discharged on the filling line. The speed of this entire operation can be adjusted to the requirements of any line, according to the manufacturer.

Tachometer

NOW available for over-speed testing of turbines, generators, and motors is a portable type 48-A tachometer with two ranges for testing either 1,800 r.p.m. or 3,600 r.p.m. machines. Marketed by Metron Instrument Co., Dept. I, 432 Lincoln St., Denver 9, Colo. The accuracy of both ranges is said to be ¼ of 1 percent.

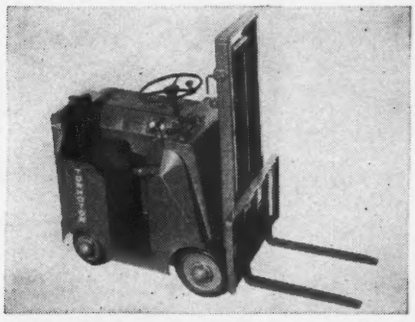
Though electric in nature the instrument does not employ a generator or magneto. Its operating power is obtained from an a.c. source of 105 to 125 v., 60 cycles. The head, which is very small and requires only ¼-in. ounce to rotate, is a positive



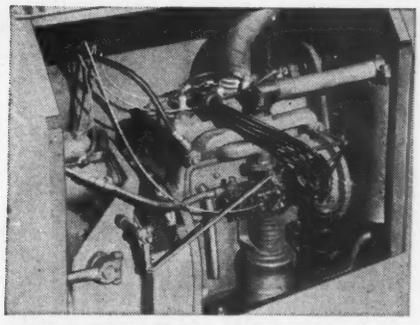
Tachometer with Neoprene contact tips.

Announcing...
The New TOWMOTOR LT-35 LIFT TRUCK

Compact and lightweight---makes it economically sound for every industry, regardless of size, to enjoy the advantages of modern, mechanized materials handling.



Unique design provides plenty of clear, accessible space for the operator while retaining small overall dimensions and low center of gravity for maximum stability.



Engine and transmission in the LT-35 are easily accessible for inspection, adjustment and maintenance.

The new Towmotor LT-35 Lift Truck can lift, carry and stack 1500 to 2000 pound loads with ease, yet it is so compact and lightweight that it may, with utmost safety, be operated under full load on freight elevators of limited capacity, on upper floor levels where low load limits are imposed, or directly into motor trucks.

Because of its size and ability to operate in confined areas, the LT-35 makes it economically sound to provide mechanical handling on jobs where manual handling, with its excessive labor costs, was formerly the only available method. The small, agile LT-35 can save time, money and manpower on your operation by taking over countless handling tasks, accomplishing them in less time, with far less effort and at lower cost.

The new LT-35 is the smallest of the complete line of Towmotor Lift Trucks and Tractors, each a product of the experience and "know-how" that Towmotor has gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1222 East 152nd Street, Cleveland 10, Ohio.

TAKE IT UP WITH

TOWMOTOR

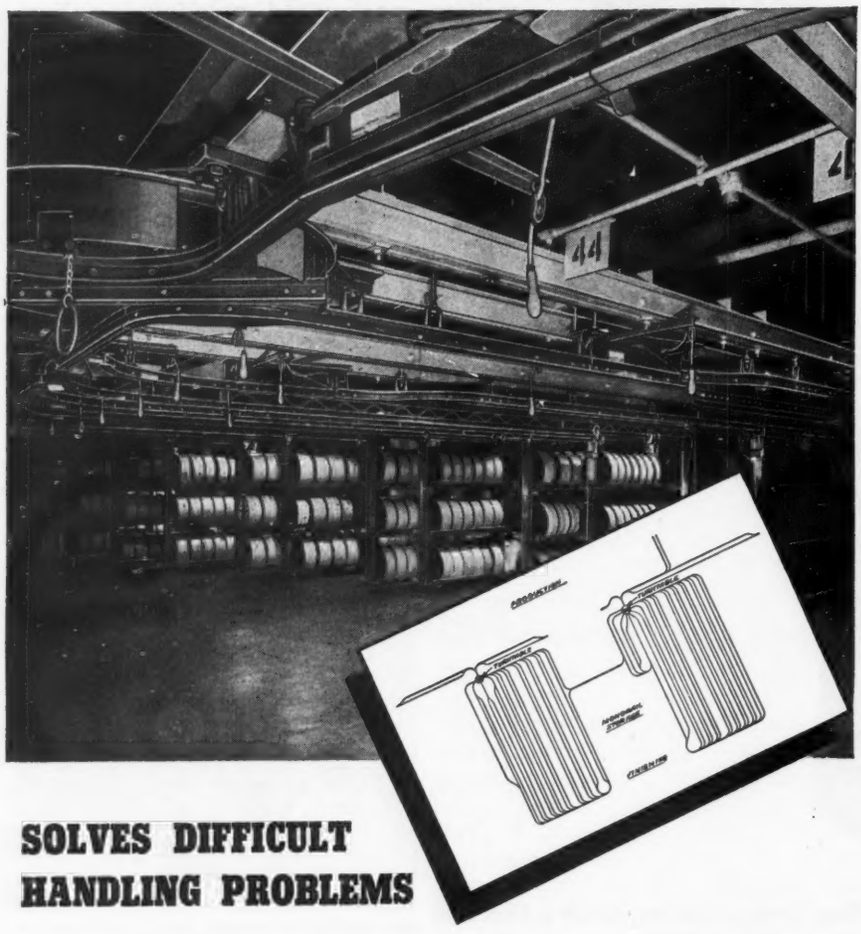
THE ONE-MAN-GANG

12 ★ FEATURES

- ★ COMPACT
- ★ LOW STEP UP TO OPERATOR'S STATION
- ★ LIGHTWEIGHT
- ★ RUGGED CONSTRUCTION
- ★ MANEUVERABLE
- ★ 4-WHEEL STABILITY
- ★ AMPLE SPACE FOR OPERATOR
- ★ EASY REACH CONTROLS
- ★ HYDRAULIC LIFTING AND TILTING MECHANISMS
- ★ MAXIMUM ACCESSIBILITY FOR INSPECTION AND MAINTENANCE
- ★ SHORT TURNING RADIUS
- ★ ENGINEERED TO THE JOB BY TOWMOTOR

FLEXIBILITY

OF AMERICAN MONORAIL EQUIPMENT



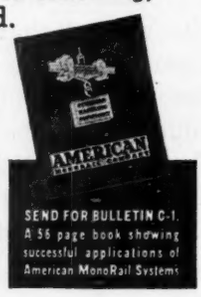
SOLVES DIFFICULT HANDLING PROBLEMS

Here is another of the hundreds upon hundreds of handling problems efficiently and economically solved by American MonoRail Overhead Handling Equipment.

THE PROBLEM: To eliminate manual handling of reels from production machines to storage, from storage to finishing, from finishing to storage or shipping as required.

THE ANSWER: The FLEXIBILITY of American MonoRail switching arrangements permits reels to move on carriers with no rehandling between processes. Ample live storage is allowed, permitting free movement between all processes.

What is your handling problem? American MonoRail Engineers come up with the answer to efficient and economical handling ninety-nine times out of a hundred. We invite your inquiries.



THE AMERICAN MONORAIL COMPANY

13125 ATHENS AVE. ● CLEVELAND 7, OHIO

acting switch connected through a reactance in a bridge circuit so that the meter indication in the bridge circuit is directly proportional to the number of switching operations per minute of the head. Neither the balance nor response to the bridge circuit is said to be affected by line voltage fluctuations between 105 and 125 v. since the instrument has a built-in voltage stabilizer. The tachometer contains no vacuum tubes. It is also available with other ranges for specialized applications.

Heat Sealer

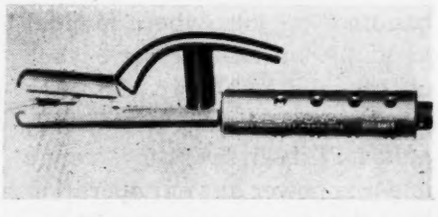
HEAT SEAL-IT CO., Dept. I, 4316 Lancaster Ave., Philadelphia, Pa., has developed a hand sealing iron particularly adaptable for users of pliofilm. The new iron features a rotating wheel that is said to roll a perfect ⅛ in. wide permanent weld quickly and uniformly. A companion

"Roll-Seal It" heat sealer

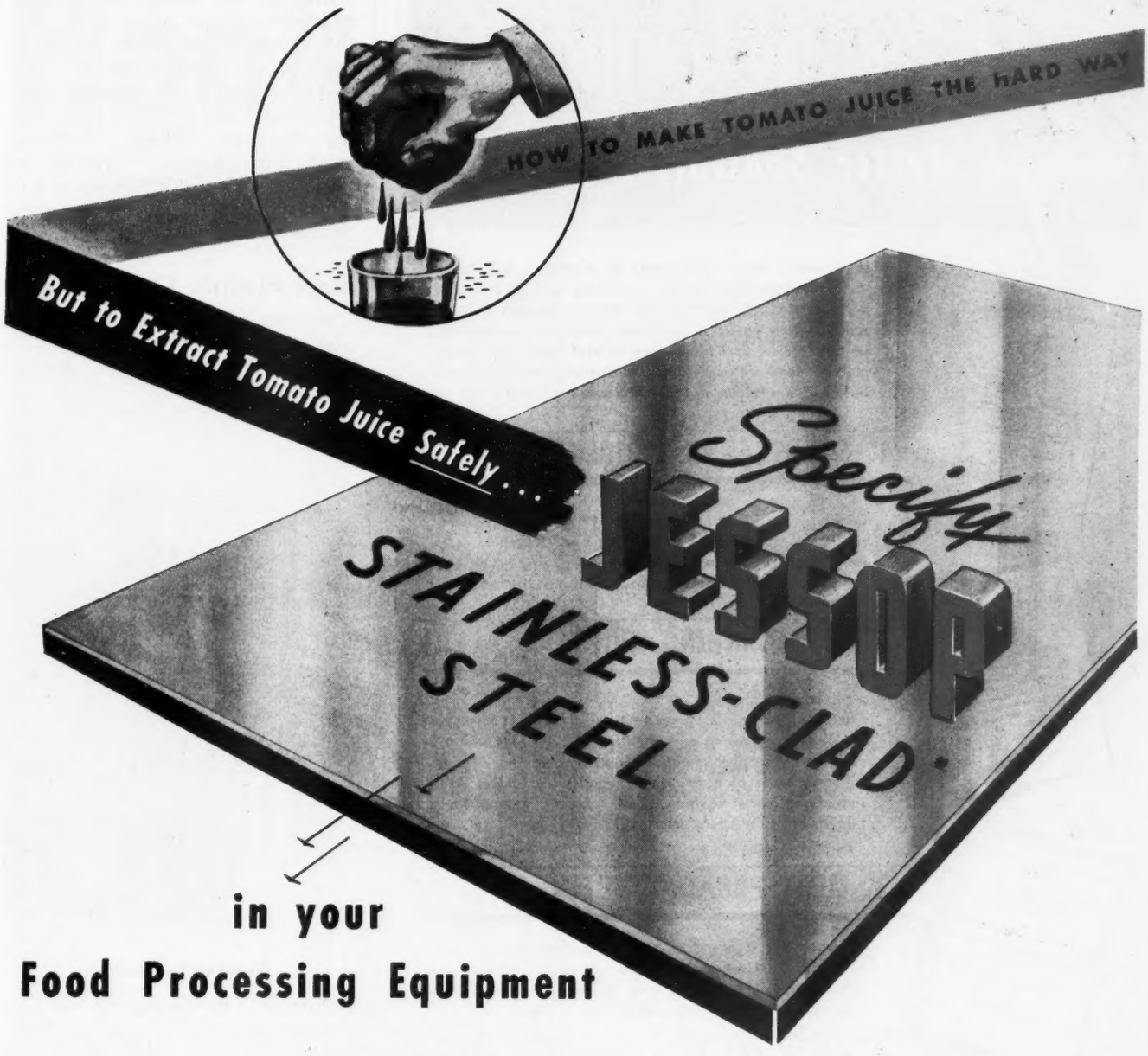
wheel prevents sticking of the seal to the iron. The third, outboard wheel levels the tool automatically and provides a perfectly straight, flat uniform seal. It is constructed of aluminum and contains anti-friction ball bearings. In addition to the heating wheel, there is a built-in heating surface on the top of the iron 2 in. square that can be used for sealing cellophane, glassine, wax paper, etc. Built-in thermostatic control is adjustable to any heat sealing material and automatically maintains correct temperature.

Electric Welding

TWECO PRODUCTS CO., Dept. I, Wichita 7, Kan., announces a line of manual arc welding electrode holders. It includes fully insulated and semi-insulated models. The principal feature of this conventional tong-type



"Twecotong" electrode holder.



in your Food Processing Equipment

★ Making tomato juice is but one example of where JESSOP Stainless-Clad Steel is being used successfully in food processing. For the stainless-steel cladding is easily cleaned and never contaminates the product, while the mild steel backing provides the necessary strength. Furthermore, JESSOP Stainless-Clad Steel transfers heat more effectively than solid stainless . . . permitting substantial savings in fuel costs when used in evaporators, pasteurizers and other food processing equipment.

Before ordering processing equipment investigate the possibilities of JESSOP Stainless-Clad Steel. Our engineers will gladly work with your fabricator in utilizing stainless-clad most effectively in your plant. Literature on request.

*Manufactured under U. S. Pat. Nos. 1,997,538; 2,044,742; 2,147,407; and 2,225,862. Can. Pat. No. 383,153.

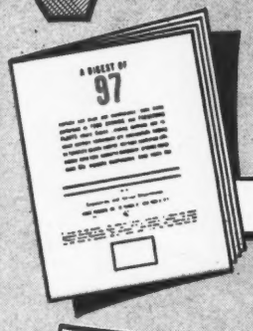
JESSOP STEEL COMPANY
HEAD OFFICE AND WORKS
WASHINGTON, PA.

• • • • •

MANUFACTURERS OF HIGH GRADE SPECIALTY STEELS

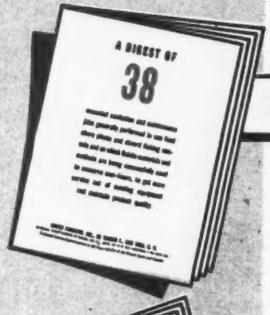
4 OAKITE GUIDES to Better Sanitation... FREE!

If you pack, can or quick freeze meat, poultry, fish, fruits, vegetables and other foods... send for whichever one of these 4 OAKITE SANITATION DIGESTS applies to your work. All are based on successful experience in hundreds of plants... each gives you helpful ideas and tested methods for more easily and economically handling essential equipment clean-up and maintenance tasks.



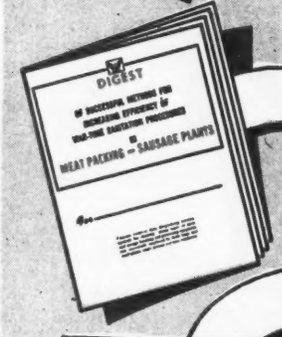
1. FOOD CANNING DIGEST

24 pages outline specific data on 97 different cleaning, sanitizing, de-scaling, rust removal and related tasks. A helpful guide in safeguarding product quality... extending useful life of processing and handling equipment.



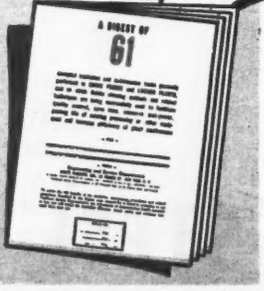
2. FISH CANNING DIGEST

Contains 8 pages of data on economical methods for keeping all fish processing and handling equipment in sanitary condition. Describes methods for safely cleaning over 38 different types of aluminum, galvanized, stainless steel, tinned and Monel equipment. All fish canners, processers, filleters and fleet operators should have a copy.



3. MEAT PACKING DIGEST

Prepared for meat packing and sausage plant superintendents. Concisely reviews from "A" to "Z" widely used, safe methods for handling over 58 essential plant sanitation and equipment maintenance jobs. 17 pages.



4. QUICK FREEZE & LOCKER PLANTS

This 12-page Digest gives time-saving tips on 61 different, commonly recurring sanitation and maintenance tasks. Describes performance-proved procedures for cleaning processing and plant equipment of all types.

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Check and mail the coupon below for whichever of these FREE helpful Oakite Digests you would like to have. Won't you do this today?

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Technical Service Representatives Located in All Principal Cities of the United States and Canada

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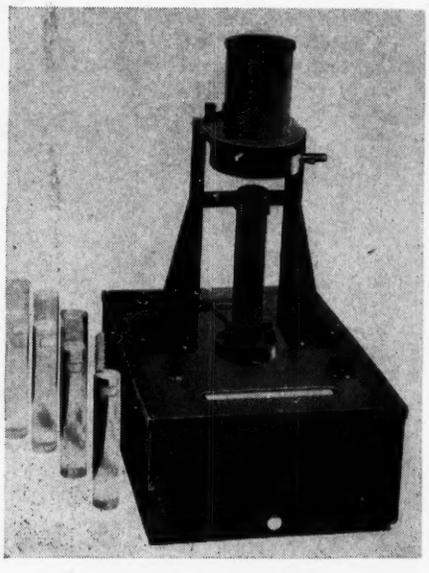
holder is the almost indestructible molded-laminated glass cloth Bakelite insulation keyed to the holder casting. Tensioning spring firmly seats on fibre upset washers and is protected from spatter by non-binding Neoprene tubing. Well-ventilated fibre handle, together with good cable connection, assures a cool running holder. All parts are replaceable.

Photoelectric Colorimeter

PHOTOVOLT CORPORATION, Dept. I, 95 Madison Ave., New York 16, announces the "Lumetron" photoelectric colorimeter, Model 450, for Nessler tubes. This is a photoelectric instrument for measuring the light transmission of liquids in Nessler tubes. The light beam passes vertically through a long-legged column, making the instrument particularly suited for the measurement of samples of pale color or faint turbidity. It furnishes high sensitivity in tests of this kind and permits operation with Nessler tubes as sample holders.



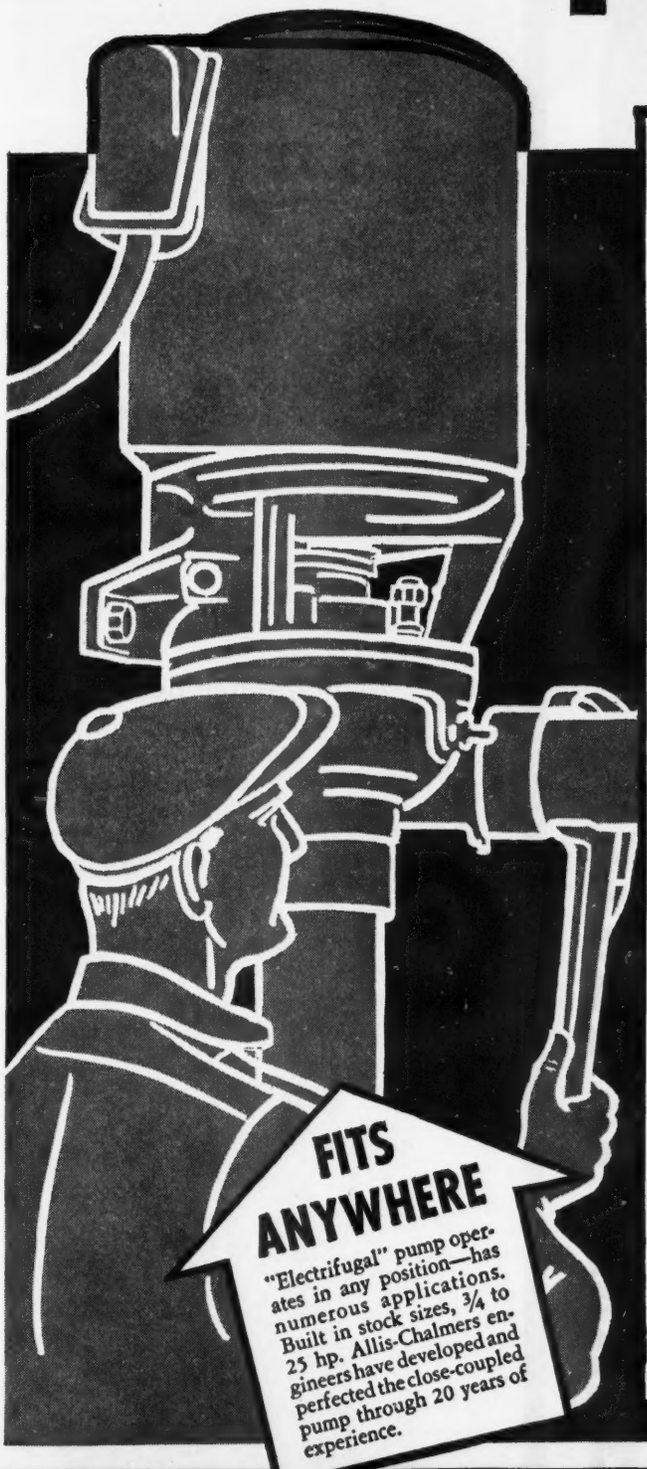
Photoelectric colorimeter.

Odorless Printing Inks

GENERAL PRINTING INK CO., Dept I, 100 Sixth Ave., New York 13, has developed a group of printing inks called "Hydry." The fundamental difference between these inks and the conventional type is that they do not oxidize, nor do they require evaporation of solvents to harden. They consist of a pigment or pigments, a vehicle composed of a newly developed special synthetic resin and an odorless organic solvent having a high boiling point.

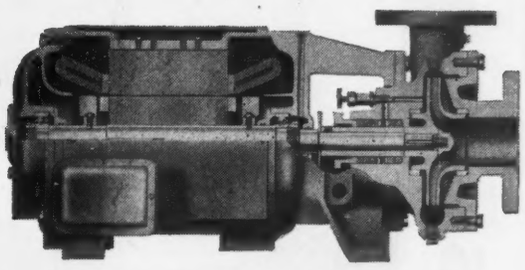
The resin is soluble in the solvent and in a mixture of the solvent in

Hook Up...AND Pump!



FITS ANYWHERE

"Electrifugal" pump operates in any position—has numerous applications. Built in stock sizes, ¾ to 25 hp. Allis-Chalmers engineers have developed and perfected the close-coupled pump through 20 years of experience.



A-C "Electrifugal" Pump Cuts Installation Time

This compact "Package" pump comes fully assembled. No coupling to line up. Just bolt it down, make pipe and power connections — prime and pump! More than that, this pump costs you *less to buy — less to operate.* Read these interesting facts:

SIMPLE, COMPACT DESIGN

Motor and pump are built into one rigid frame, with rotor and pump runner on a single shaft. Result: one third less space — fewer parts — *lower cost.*

EASY TO SERVICE

Packings, rotor, impeller, and all moving parts are easy to get at. Quickly taken apart, checked, and reassembled. Down time is reduced to a minimum.

LOW MAINTENANCE

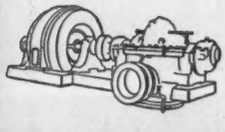
Ample bronze wearing rings, bronze water seal and valve — shaft sleeve and deflector — five packing rings — precision workmanship — and other quality features all add up to longer life, less maintenance cost.

UNDIVIDED RESPONSIBILITY

Allis-Chalmers builds both pumps and motors — backs them up with unsurpassed experience and reputation in both fields. Call your A-C office for help on any pumping problem . . . or write for bulletin B6059. ALLIS-CHALMERS, Milwaukee 1, Wisconsin.

ALLIS CHALMERS

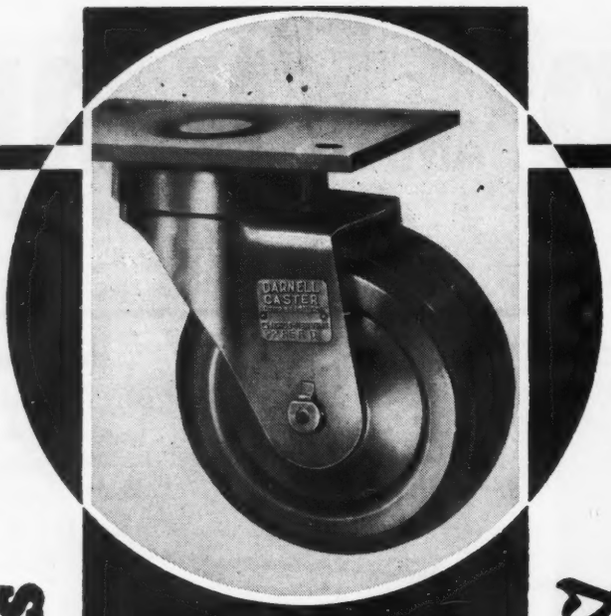
Electrifugal **PUMPS**



COMPLETE LINE

of centrifugal pumps and motors. Single or double suction—single- and multi-stage—capacities to 170,000 gpm.

A 2010



Darnell CASTERS & WHEELS

A SAVING AT EVERY TURN

Darnell Dependability assures savings, service, safety, speed. A caster or wheel for every use.

You are sure to find the exact caster or wheel for your individual requirements in the Darnell line.

Write

FOR NEW 192 PAGE DARNELL MANUAL

DARNELL CORP. LTD.
LONG BEACH 4, CALIFORNIA
60 WALKER ST., NEW YORK 13, N. Y.
36 N. CLINTON, CHICAGO 6, ILL.

Darnell CASTERS & WHEELS

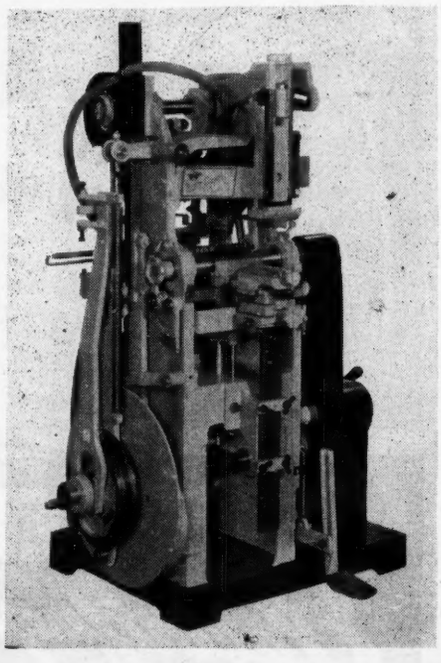
a limited quantity of water. It is insoluble in a mixture of solvent and a greater quantity of water. When a film of this composition is subjected to a quantity of water a thin hard film is formed. The small amount of moisture present in the air is usually sufficient to harden the outer surface of a thin freshly printed film in 10 to 20 minutes. When an excess of moisture in the form of steam, however, is impinged on the outer film surface it hardens immediately. This thin hard crust prevents offset and "stick" as the printing progresses into the delivery or rewind.

Electronic Switch

UNITED CINEPHONE CORP., Dept. I, Torrington, Conn., announce an electronic switch which embodies all the other features of the standard Cinephone switch operating with 30 amp., but can also be used in the presence of explosive gases. This model uses a relay with contacts which are hermetically sealed. Maintenance beyond replacing the Type 2050 Thyraton tube at infrequent intervals is said not to be required.

Labeling Machine

NEW JERSEY MACHINE CORP., Dept. I, 1610 Willow Ave., Hoboken, N. J., announces an improved labeling machine for food manufacturers and packers. It combines the twin roller method of label gluing with the vacuum principle of label pick up and delivery. Vacuum is utilized to provide for positive pick up of label from hopper, transferring it across glue



Improved Model 86-M labeler.

More eyes reach for your product

IN WHITER, BRIGHTER COATED LITHWITE CARTONS

Shoppers' hands reach only after their eyes reach... in the modern self-serve store

A STAND-OUT PRODUCT IS FINE. But as modern retailing swings more and more to super markets and self-service, a stand-out *package* is becoming increasingly important. That's why the makers of many of America's leading products were quick to see the eye-catching advantages of *Coated* Lithwite cartons.

For *Coated* Lithwite cartons stand out in shelf, mass and island displays... reach out for attention... make more "impulse" sales. A revolutionary new kind of paperboard, that is made and coated in one high-speed operation, *Coated* Lithwite is whiter, brighter. Its smooth, chalk-free surface is a perfect base for printing inks. It makes colors *sing*. It brings pictures vividly, realistically, to *life*.

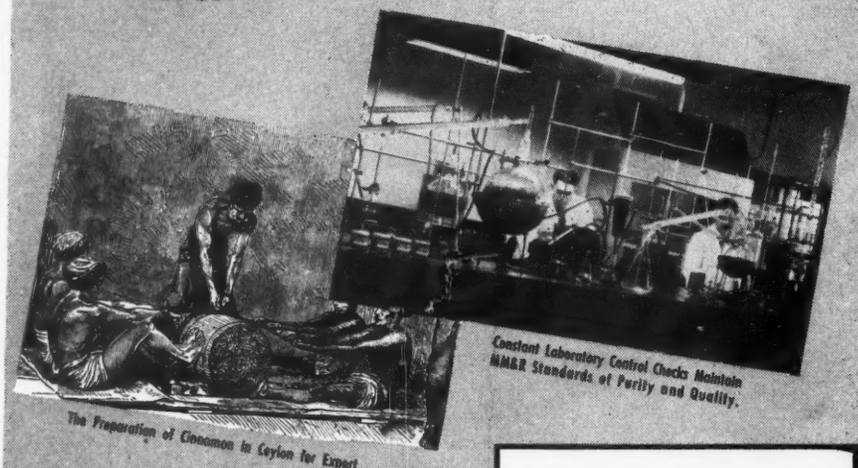
You'll find you have fewer jammers and leakers with *Coated* Lithwite cartons, too. They fold accurately without shattering or flaking, give a tight, positive seal. Production is currently sold up, but now's a good time to lay future plans, discuss time-proved, sales-proved *Coated* Lithwite cartons with a Gardner-Richardson representative.

Coated Lithwite Cartons

THE GARDNER-RICHARDSON CO. • Manufacturers of Folding Cartons and Boxboard • Middletown, Ohio

Sales Representatives in Principal Cities: PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT

Which Has Greater Purity?



The Preparation of Cinnamon in Ceylon for Export

Constant Laboratory Control Checks Maintain MM&R Standards of Purity and Quality.

The Answer is one of 11 reasons Why You Should Use

MM&R SPICE OILS for MODERN FLAVOR CONTROL

Of course there's a distinct possibility of introducing dirt and other contaminating and mold-producing substances into your product when you use dry spices—a danger that you can eliminate entirely through the use of MM&R Spice Essential Oils and Spice Oil Mixtures. For MM&R *liquid* spices are uniformly pure and wholesome... the laboratory-distilled *essence* of natural spices, free from all extraneous matter.

And that's not all — highly-concentrated spice oils are more economical . . . easier to handle and store . . . provide uniform distribution of flavor without color disturbance.

These are just a few of the 11 reasons why producers find a *better* flavoring job is being done by Spice Essential Oils . . . *the MM&R brand* . . . pioneer and pacesetter in the field of Spice Oils for the food industry.

1. Uniformity of quality and flavoring
2. No color disturbance
3. Less bulk in storage
4. Less weight in shipping
5. No danger of molding
6. No loss by exposure in package while being stored
7. No starch introduced into your mixture
8. Ease of handling
9. Less cost as compared to equivalent spice value
10. Entire flavor available immediately
11. Elimination of the possibility of dust and dirt

Send for "Table of Equivalents" Showing Comparative Flavoring Strengths of Whole Spices and Spice Oils

MAGNUS, MABEE & REYNARD, INC.

SINCE 1895 . . . ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

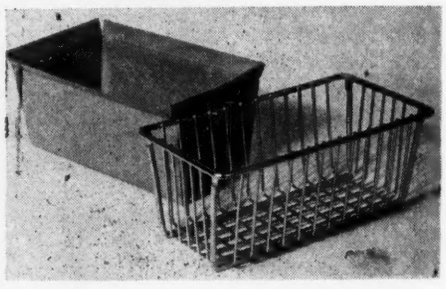
16 DESBROSSES STREET, NEW YORK 13, N.Y. • 221 NORTH LASALLE STREET, CHICAGO 1, ILL.

Los Angeles: Braun Corp. • Seattle, Portland, Spokane: Van Waters and Rogers, Inc.
San Francisco: Braun-Knecht-Heimann Co. • Canada: Richardson Agencies, Ltd., Toronto

roll and delivery to its place on the container. Uniform distribution of glue and positive control of the film of adhesive applied are provided by the adjustable twin rollers. Glue seepage, wiping of containers, blisters and wrinkles are eliminated. The label hopper is adjustable for all sizes and shapes of labels. Practically any kind of ordinarily printed, nonporous paper can be handled. Labels can be applied on flat, round, convex and concave surfaces as well as on containers having recesses or raised panels.

Paper Baking Pan

A PAPER baking pan, a combination of laminated protective papers and an ingenious leakproof folding construction, is announced by Basic Food Materials, Inc., Dept. I, Cleveland, Ohio. This paper pan is said



Paper baking pan and holder.

to withstand the heat of baking and to afford protection against moisture and grease penetration. It can be used for such products as baked meat loaves, jellied products, molded specialties, precooked frozen foods, and baked goods.

Fire Extinguisher

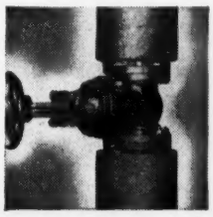
A CARBON DIOXIDE portable fire extinguisher in a complete range of sizes from 2 to 100 lb. is announced by the General Detroit Corp., Dept. I, 2270 E. Jefferson Ave., Detroit 7, Mich. The line is said to be approved by the underwriters. It is especially recommended for fighting fires in electrical equipment, oil, grease, and other flammable liquids.

Detergent

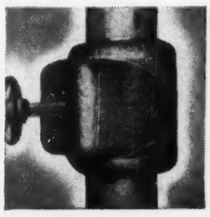
THE Penetone Company, Dept. I, Tenafly, N. J., has developed a new type of detergent for use in steam cleaning. This material is said not to clog either lines or nozzles. It has a high alkalinity and will rapidly remove stubborn grease, oil and grime accumulations. It is instantly soluble in water, requiring no agitation, and is said to be economical.

Here's how to "dress up" cork insulated lines

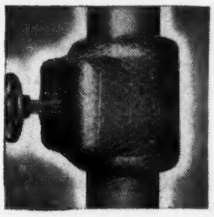
These pictures show the application of Armstrong's Cork Covering to a fitting where both efficient insulation and maximum attractiveness are wanted. Although covering often must be thick to help maintain low temperatures, it need not look clumsy and conspicuous. It can be streamlined, with a surface that's easy to clean.



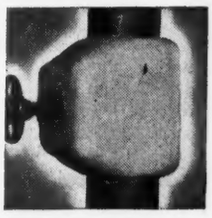
1. Cork covering on cold line ready for final finish; valve still uninsulated.



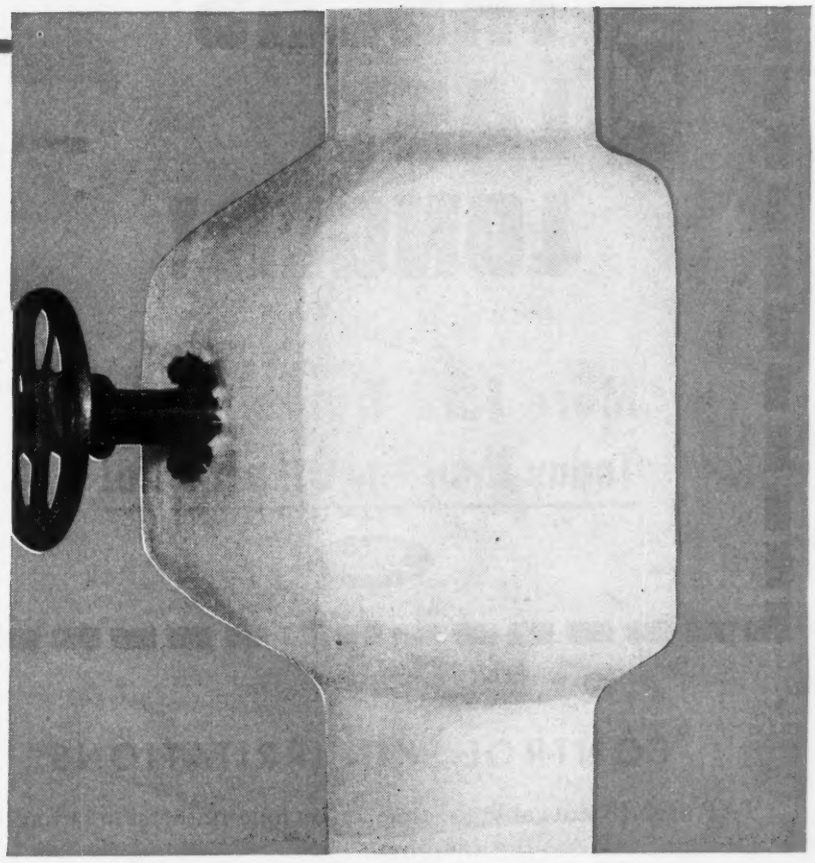
2. Sections of Armstrong's Fitting Cover cemented together and wired on.



3. Hexagonal mesh wire stapled over fitting cover to provide key for cement.



4. Asbestos and portland cement mixture troweled on in two coats.



5. Final finish on low-temperature valve and line is 8-oz. canvas, sewed on, sized and painted with two coats of good quality oil paint in desired color. (Steps not shown here: all joints are sealed with Armstrong's Seam Filler, and interior voids are poured with Armstrong's Fitting Filler.)

COLD LINE INSULATION must always be efficient—but in many applications a smooth, clean looking appearance is a further asset. In buildings where cold lines are exposed, the application of this finish can contribute greatly to ease of maintenance and sanitary appearance.

Straight sections of covering are finished in the same manner as fitting covers, except that instead of the addition of hexagonal mesh wire and cement, rosin sized paper is wrapped around the cork covering before application of the sewed canvas and paint finish.

For further information on Armstrong's Cork Covering and other low-temperature insulation, write today to Armstrong Cork Co., Building Materials Division, 4207 Concord Street, Lancaster, Pa.

ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

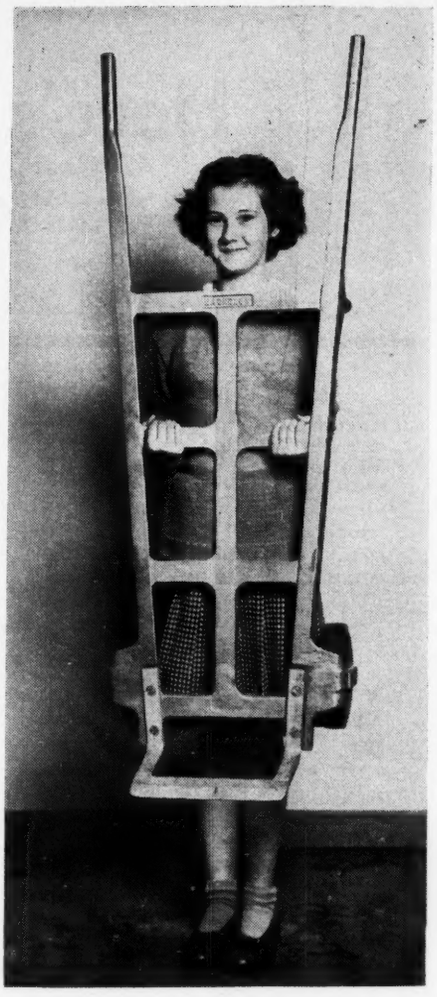
From 300° Below Zero

To 2600° Fahrenheit

FORD TRUCKS LAST LONGER!

More Ford Trucks in Use Today Than Any Other Make!

Ford



Light hand truck.

Light Hand Truck

A REGULAR duty hand truck, so light that a twelve-year old girl can carry it, weighing only 26.6 lb., is announced by Magnelux Manufacturing Co., Dept. I, 321 E. Fourth St., Los Angeles 13, Calif. It is known as the "Zephyr Hand Truck" and is made of cast magnesium alloy. All stress points have been doubly reinforced. Perfect balance has been obtained so that the Zephyr when unloaded, automatically falls forward. Wheels are cast magnesium, equipped with ball bearings and Zerk lubricated. Rubber tread is molded on. The nose is made of rustproof steel. To avoid snagging, all sharp points have been eliminated.

Magnetic Motor Starter

FEDERAL ELECTRIC PRODUCTS CO., Dept. I, Hartford, Conn., announces the addition to their line of size 3 magnetic motor starters and contactors. Because of the increased size and certain larger and heavier parts, minor constructional changes have been made.

Double-break pure silver contacts

CONTROL SKIN IRRITATIONS

TARBONIS cuts absenteeism! Dermatitis due to the handling of a wide variety of foodstuffs—too long immersion of hands in brine—constant contact with acid-type foods, has been practically eliminated in many plants through the use of TARBONIS.

Not merely a protective, TARBONIS is also effective in clearing up a high percentage of stubborn skin conditions encountered in industry. Easy to apply—nothing to remove. Pleasant, odorless, greaseless, stainless.

THE TARBONIS COMPANY
4300 Euclid Ave. Dept. FI Cleveland 3, Ohio
Please send me a good sized jar of TARBONIS and complete information.
NAME.....
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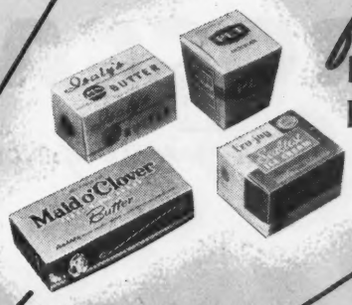
A Complete RANGE OF MATERIALS

FOR A COMPLETE PACKAGING SERVICE

- PAPER
- PAPERBOARD
- TRANSPARENT FILM
- ALUMINUM FOIL
- WAXED PAPER
- HEAT-SEALING COATED MATERIALS
- LAMINATED PAPER
- LAMINATED AND COATED GLASSINE
- LAMINATED PAPERBOARD

for BAKED GOODS

for ICE CREAM and BUTTER



for DRIED FOODS

for PRE-MIXED FOODS

for FROZEN FOODS

for PROCESS CHEESE

for MEAT PRODUCT

for CONFECTIONS and TOBACCO

When you submit your package problem to Marathon, you receive (1) the recommendations of Marathon's highly skilled technical staff; (2) the quality-control advantages of Marathon's completely integrated production; and (3) the full benefit of Marathon's complete range of materials to assure you a package "built for the job."

MARATHON CORPORATION
MENASHA, WISCONSIN

MARATHON

ROCCAL
BRAND
Sanitizing Agent

SUDDEN DEATH *to Germs!*

ROCCAL, the germicide of tomorrow, is ready to go to work for you today. ROCCAL is a powerful germicide possessing many advantages over the sanitizing agents now in general use. ROCCAL is *safer* to use for sanitizing equipment or any surface that comes into contact with food or drink. ROCCAL kills bacteria! It inhibits growth of molds, slimes and algae.

In recommended dilutions, ROCCAL is non-poisonous, virtually odorless and tasteless. It is non-corrosive . . . will not injure metal or fabrics. It is non-irritating to operator's hands.

ROCCAL is accepted by leading public health authorities.

Mail coupon now for additional information and a sample bottle of the germicide of tomorrow.

COUPON *brings sample and literature*

Industrial Division, Winthrop Chemical Company, Inc.
1450 Broadway, New York 18, N. Y.

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STREET.....

CITY.....STATE.....

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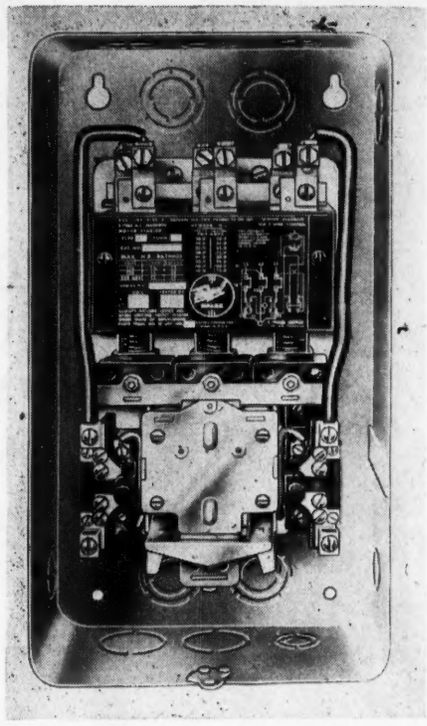
INDUSTRIAL DIVISION

WINTHROP CHEMICAL COMPANY, INC.

1450 Broadway, New York 18, N. Y.



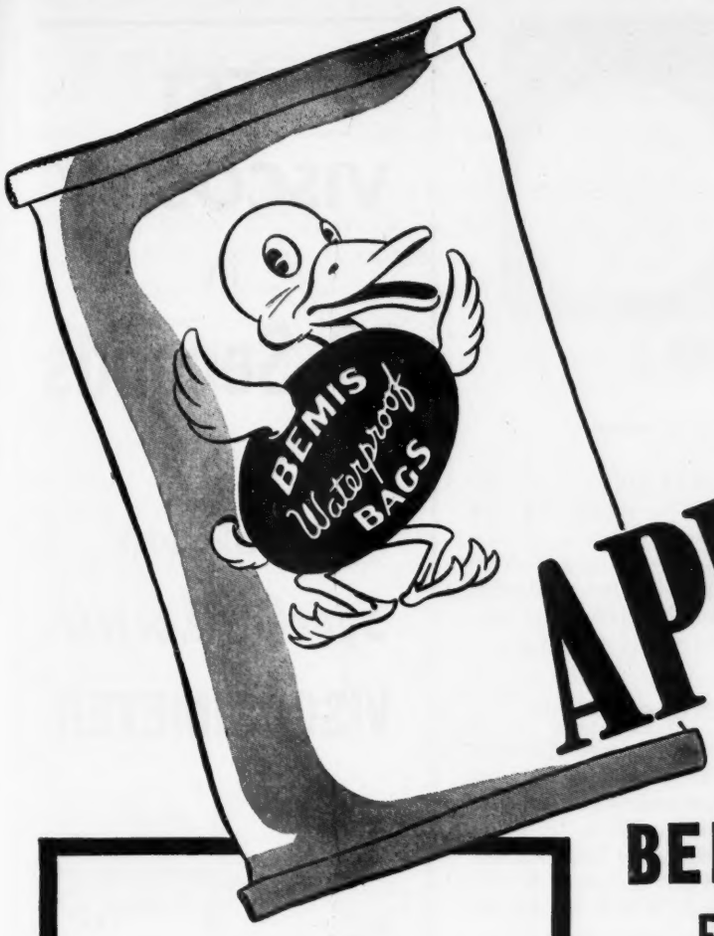
Magnetic motor starter.

eliminate all pigtails and flexible jumpers. Heavy arc barriers are strategically located to secure mechanical strength and provide high arc rupturing ability. Each pole of the stationary contact assembly is separately encased in its own sealed arc chamber. Movable contacts are mounted on individual mold blocks and are readily removable for inspection and replacement. All wire connection terminals are of the solderless-pressure type.

Automatic Retort Controller

AN entirely automatic retort cycle controller has been introducted by C. J. Tagliabue Division, Portable Products Corporation, Dept. I, 554 Park Ave., Brooklyn 5, N. Y. With the cam set for the desired time, the operator merely presses a button to place the controller in operation. The steam valve then opens wide to heat the retort and its contents. Timing automatically starts when the temperature reaches the processing point and it terminates at the exact moment for which it is set. The cooling water and overflow valves are then opened, thus cooling the retort sufficiently for unloading. At this point the cooling water valve closes and the drain valve opens.

The flow of steam into the retort is always indicated by a red light on the controller, which is automatically extinguished when the steam valve is shut off. Similarly, a white light appears while the cooling water is being admitted to the retort.



APPROVED!

A.D.M.I. Tests and OK's
BEMIS *Waterproof* BAGS
For Nonfat Dry Milk Solids

Two new moistureproof bags developed by Bemis have been approved by the American Dry Milk Institute for shipping Nonfat Dry Milk Solids for human consumption.

You'll find these paperlined textile bags keep moisture content of nonfat dry milk solids within the necessary 3% to 5%.

They assure clean, safe storage. And they are easy to handle ... save time, labor and space.

You'll find workmen approve these new bags, too, because they're used to handling bags of flour, sugar, salt and similar products. Bags are lighter in weight, easy to stack and open.

Have a talk with your supplier of nonfat dry milk solids about the use of these new Bemis Waterproof Bags.

NOTE THESE FEATURES

1. Approved by American Dry Milk Institute
2. Easy to handle
3. Keep contents clean and safe
4. Light in weight
5. Save space
6. Easy and fast to unload

BEMIS BRO. BAG CO.

GENERAL OFFICES • ST. LOUIS 2, MO.

26 PLANTS THROUGHOUT THE COUNTRY

Send Coupon for Information

BEMIS BRO. BAG CO.
408-C Pine St., St. Louis 2, Mo.

Gentlemen: I am interested in the new Bemis Waterproof Paperlined Textile Bags for nonfat dry milk solids. Please send me information.

*Name*_____

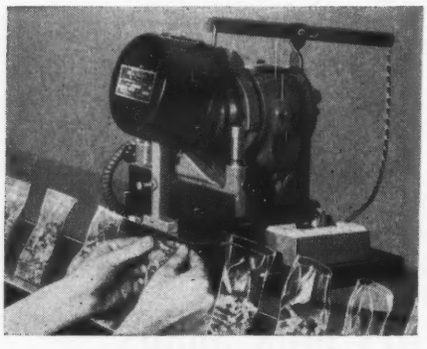
*Firm*_____

*Address*_____

*City*_____ *State*_____

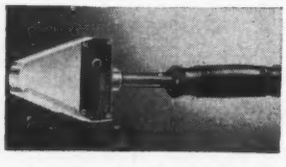
HEAT SEAL-IT MACHINES

The first "low cost" bag and envelope making machine . . . no experience required for operation. Will make bags from 2" up to 6" wide and from 2" up to 12" long. No electric motor required. Automatic thermostatic control of all heating surfaces. Quick delivery. Write for complete information.



"CRIMP SEAL-IT"

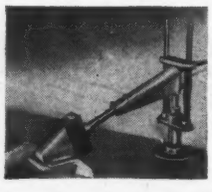
Latest development in compact, low cost bag sealing equipment. Applies a perfect seal to all types of heat sealing bags, envelopes, etc. up to 7" wide by new highly efficient method of pressure application. ALSO FOLDS BAG, as it is sealed, in one sure quick operation. Automatic thermostatic heat control. Heavy duty gear head electric motor. Write for further information.



HAND SEAL-IT

Aluminum hand-sealing iron containing 2 built-in sealing surfaces. Automatic thermostatic control adjustable to any heat sealing wrapping material.

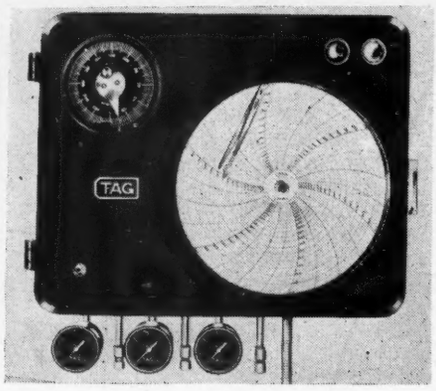
WRAP SEAL-IT



Ingenious, foot-operated heat sealing iron —frees both hands for wrapping. Production 50% faster . . . safer, more economical.

WRITE FOR CATALOG

HEAT SEAL-IT COMPANY
4318 PARRISH ST., PHILADELPHIA 4, PA.



Automatic retort controller.

When neither light appears on the controller, it is the signal for the operator that the contents of the retort may be removed.

This instrument is also adaptable to other processes involving the control of temperature and pressure.

Silicone Defoamers

To overcome the problem of foaming met in industrial operations such as steam distillation and vacuum evaporation of products, Dow Corning Corp., Dept. I, Midland, Mich., offers a "DC Antifoam A," an entirely new silicone compound. It was developed especially for use against foam in aqueous solutions and emulsions.

Tests have established that it is effective in very low concentrations, ranging from a maximum of seven parts per 10,000 against strong foamers, to one part in a million against weak foamers. An indicative of possible applications, in tests made with egg albumen it required 700 parts per million for defoaming.

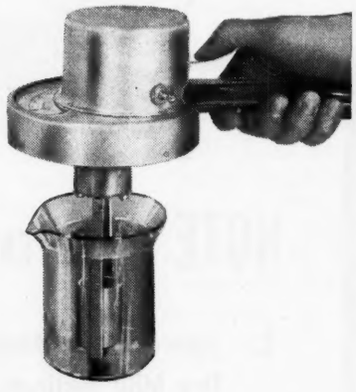
This new silicone antifoam agent is a viscous compound that is translucent, colorless and tasteless. It is chemically inert, non-volatile, and has a slight but not unpleasant odor. It is insoluble in water or alcohol.

It is available in 1-, 10-, and 50-lb. cans. Samples for trial applications are available.

Drum Skid

A GENERAL Purpose Barrel and drum skid that will safely support loads up to 1,200 lb. is announced by Ironbound Box & Lumber Co., Dept. I, 650 Hoffman Place, Hillside, N. J. The hardwood rails are full length reinforced with heavy steel bands. Steel hooks at one end anchor it securely to back of motor trucks or to loading platforms. Unit is light in weight and can be easily hung out of the way when not in use. It is available in three standard sizes, 8, 10 and 12 ft. long.

TEST VISCOSITY in 30 Seconds with a Brookfield *Synchro-Lectric* VISCOSIMETER



★ *FAST*
★ *ACCURATE*
★ *SIMPLE*
★ *STURDY*

Save valuable production time and get closer control by running viscosity tests right on the job. Variable speed units make it possible to measure materials of plastic flow at different rates of shear.

Send for bulletin giving complete information.

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CATALOGS, BULLETINS

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Food Plant Equipment

Valves 1

Bulletin 5060 describes a newly designed 30 deg. globe pattern valve manufactured by Grove Regulator Co. It shows how this design keeps turbulence at a minimum by reducing the directional change of the liquid flow through the valve. It explains how wire drawing and cutting action are almost entirely removed.

Flame Guns 2

Flame guns, manufactured by the Hauck Manufacturing Co., are described and illustrated in a 24-page catalog, No. 2028. The various types of applications for which each model is best suited are shown. An important use is to destroy weeds. The sizes range from relatively small portable units to larger sizes with single and double flame guns on wheels. They all operate on kerosene, range oil, stove oil or light furnace oil.

High Vacuum 3

National Research Corp. tells of the commercial possibilities for high vacuum in a brochure that is clearly written and well illustrated. High Vacuum is described as a precise new tool for industry. It tells how, for the first time, it provides commercial applications with pressures in range of 0.000001 to 1 mm. Hg. This 24-page booklet contains numerous clear shots of equipment in actual operation.

Freezing Plant 4

Moving food from the packaging machine to the freezing chamber, through the chamber and out to the storage and shipping departments, without anyone entering the chamber, is described in a 4-page folder issued by Salem Engineering Co., entitled "Salematic Commercial Freezing Plant."

Sanitation Equipment 5

Chain Belt Co., in a 44-page book, No. 46-3, presents its complete line of sanitation and liquid clarification equipment. Pictures, drawings and diagrams are used profusely throughout the book. The equipment illustrated and described includes conveyor sludge collectors, Tow-Bro sludge removers, grit collectors and washers, Verti-Flo thickeners, skimmers, Aero-filters and other liquid clarification equipment. Typical sewage treatment flow sheets indicating equipment most suitable in the primary treatment, chemical treatment and other methods are included.

Hot Water Heater.....6

A 20-page catalog on hot water storage heaters has been made available by The Patterson-Kelley Co., Inc. Construction data on the various types of water heaters are given. Capacity and weight tables are included as well as engineering data on dimensions and temperature ranges. Examples show how to find the heating capacities of the various heaters listed.

Plant Supplies

Protective Clothing 7

The B. F. Goodrich Co. has released a 10-page catalog section, No. 12,000, describing and illustrating its complete line of industrial protective clothing. Recent additions to the line are vinyl-resin coats that cannot be stained by oil and grease, synthetic coated clothing superior to prewar products, including an apron coated with Ameripol.

Odorless Paint 8

In a 4-page bulletin the Peninsular Chemical Products Co. describes an odorless chemical-resistant maintenance paint. Among its outstanding features are: resistance to acids, alkalis, water and other materials, and its ease of application. It sets in 30 minutes or less to a hard but flexible film of plastic which is non-inflammable.

Quick Freeze Plant Maintenance.....9

A revised 24-page booklet, describing 61 essential sanitation and maintenance cleaning tasks generally performed in quick freeze and locker plants, is now available from Oakite Products Inc. The booklet contains many practical recommendations for safely cleaning numerous types of cooking, mixing, cutting, conveying, packing and other processing and handling equipment required in preparing fresh fruits and vegetables and other products for quick freezing and storing. Supplementing the data on cleaning equipment is a section devoted to the germicidal treatment of surfaces after cleaning. This will help to avoid product contamination and spoilage loss from uncontrolled mold and bacteria growth. Also included is information on stripping paint from machinery before repainting, removing lime scale from refrigerant and evaporative condensers, cleaning floors and many other cleaning jobs.

Heat Resisting Coatings.....10

Heat resisting coatings, to protect metal surfaces against temperature damage, are described in a 4-page bulletin issued by the Dampney Co. of America. The bulletin also tells how these coatings are applied. Included is a list of typical applications, with data sheets.

Label Catalog 11

Stock-designed and custom-made labels are the subject of a label catalog issued by Ever Ready Label Corp. Its 32 colorful pages are replete with versatile label ideas.

Glassware 12

Corning Glass Works has issued Supplement No. 2 of the Laboratory Glassware Catalog LP 24 containing price revisions on all items in Parts I, IV, V and VI.

Insulation Materials 13

The Philip Carey Mfg. Co. has released a revised edition of their heat insulation materials catalog. It has been developed to facilitate the specification and purchase of heat insulation for industrial and commercial use. The

Good until September, 1946

FOOD INDUSTRIES READERS' SERVICE

FOOD INDUSTRIES, 330 W. 42nd St., New York City 18

Please have manufacturer send me, without obligation, literature circled below.

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16 17 18 19 20 21 22

NAME..... TITLE.....

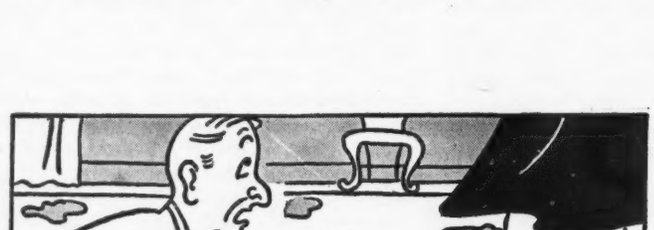
FIRM OR AFFILIATION.....

ADDRESS .....

7-46

Which form of DDT should you use?

FOR HARD-TO-GET-AT PLACES—Use Du Pont DEENOL 10-A. It's 10% DDT dusting powder that's light, free-flowing, and effective against larger crawling insects in cracks and crevices.



WHEN RESIDUE MUST NOT SHOW—Get lasting, invisible protection with Du Pont DEENOL 25-EM. It's 25% DDT in a miscible oil that mixes easily with water for spraying.

WHERE YOU NEED MAXIMUM, LONG-LASTING COATING—You need DEENOL 50-F, Du Pont's 50% DDT wettable powder. Mixes *quickly* for spraying—leaves minimum visible residue.

ON SURFACES WATER WOULD DAMAGE—Spray DEENOL 5-H. It's Du Pont's 5% DDT all-oil spray that gives invisible DDT protection where you can't use water sprays. It's ready mixed.

IF YOU WANT TO MIX YOUR OWN—Making finished sprays is simple when you use DEENOL 25-C, a 25% DDT oil concentrate. Add other insecticidal ingredients if needed.

★ ★ ★

USE "DEENOL" DDT Insecticides designed by Du Pont especially for commercial application. Five different forms of DEENOL DDT cover all requirements. Their precise formulations, based on Du Pont research and experience, assure you of easy application—effective kill—and long-lasting insect control.

See your supplier today for DEENOL DDT insecticides. If he can't supply you, write direct to us and we'll send you complete information. Address your inquiry to E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department (FI-1), Wilmington 98, Delaware.

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REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING

. . . *THROUGH CHEMISTRY*

new catalog offers heat loss tables, selection charts and data for determining insulation thicknesses, data on the comparative efficiencies of the various types of insulation together with mechanical, thermal and performance characteristics.

Plastic Coating 14

"Nukemite," a product developed during the war, and now available for general industrial use, is described in a 12-page brochure released by Nukem Products Corp. The booklet tells how this plastic material is protection against acid, alkalies and solvents. It also lists the products that can be surface protected by this material, such as concrete, structural steel, wood and numerous others. Instructions on how to apply it are given. Information as to its chemical resistance, colors in which it is available, and coverage data are all included. Actual photographs of outdoor equipment, such as bridges and tank cars are shown.

Mycalex Products 15

General Electric Co. has issued a 24-page booklet on "Mycalex Products," a stone-like material composed of mica and a special glass. This illustrated bulletin lists the properties, available type, molded parts, fabricated parts, machining practice and how and where to order the material. An important feature is a properties chart of six grades of Mycalex of both the compression- and injection-molded types. The dielectric qualities, arc and heat resistance, mechanical strength, water absorption, moldability and machinability are compared with the same properties of cold-molded refractory materials, hot-molded phenolics, wet-process porcelain, and fused quartz.

Control Equipment

Thermostats and Relays.....16

Bulletin "T," a 12-page catalog issued by Precision Thermometer and Instrument Co., includes information on thermostats and thermoregulators. Also contains data on the Princo "Magan-Set," an adjustable thermoregulator with simplified magnetic micrometer control which permits of changes as slight as 0.0050 C. in the operating temperature and which controls a correctly designed constant-temperature bath to within 0.02 deg. C. or less.

Remote Control 17

Catalog Section 52-A, describing remote control instruments for low flow rate has been issued by Fischer & Porter Co. Drop-by-drop flow rates, right down to less than 5 milliliters of liquid per minute, and for gases to less than 25 milliliters per minute, can be measured by the remote automatic control, described in this bulletin. It tells how this instrument, when attached to rotameters, measures, by electronic means, the rotameter float position.

with more space available to handle your shipments

TWICE AS FAST! Yes, many Air Express shipments now travel at almost double former air-speeds — in the swift new planes now operated by the Airlines.

YET COST IS DOWN. Reduced rates (see table) include special pick-up and delivery, making same-day delivery possible between many airport towns and cities.

MORE SPACE AVAILABLE — in bigger planes, in more planes. Service direct between all major U. S. towns and cities. Rapid air-rail schedules to and from 23,000 other communities in this country. Foreign service direct by air to and from scores of countries — the world's best service, in the world's best planes.

RATES CUT 22% SINCE 1943 (U. S. A.)					
AIR MILES	2 lbs.	5 lbs.	25 lbs.	40 lbs.	Over 40 lbs. Cents per lb.
149	$1.00	$1.00	$1.00	$1.23	3.07c
349	1.02	1.18	2.30	3.68	9.21c
549	1.07	1.42	3.84	6.14	15.35c
1049	1.17	1.98	7.68	12.28	30.70c
2349	1.45	3.53	17.65	28.24	70.61c
Over 2350	1.47	3.68	18.42	29.47	73.68c
INTERNATIONAL RATES ALSO REDUCED					

WRITE TODAY for the Time and Rate Schedule on Air Express. It contains illuminating facts to help you solve many a shipping problem. Air Express Division, Railway Express Agency, 230 Park Avenue, New York 17, N. Y. Or ask for it at any Airline or Railway Express office.

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GETS THERE FIRST

Phone AIR EXPRESS DIVISION, RAILWAY EXPRESS AGENCY
Representing the AIRLINES of the United States

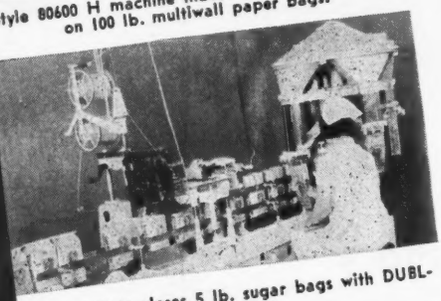
BEANS?

Style 60000 D sewing head trims tops and closes paper bags with Union Special's exclusive DUBL-TAPE closure.

STARCH?

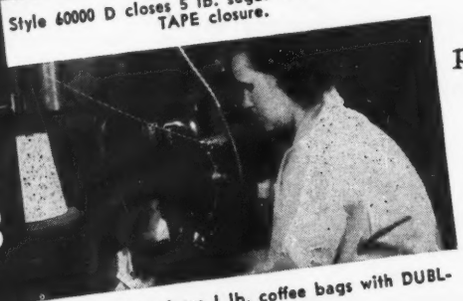
Style 80600 H machine makes tape bound closure on 100 lb. multiwall paper bags.

SUGAR?



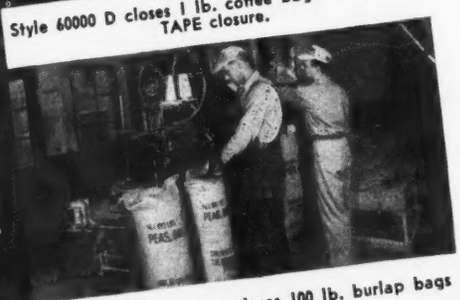
Style 60000 D closes 5 lb. sugar bags with DUBL-TAPE closure.

COFFEE?



Style 60000 D closes 1 lb. coffee bags with DUBL-TAPE closure.

PEAS?



Style 14500 H machine closes 100 lb. burlap bags containing split peas.

DOG FOOD?

Style 60000 D applies DUBL-TAPE closure to paper bags containing dog food.

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If you want a simple . . . dependable . . . economical solution for your packaging problems, check with Union Special. For more than fifty years, Union Special has worked in close cooperation with makers of bags, conveyors, and bag filling and weighing equipment to produce specially designed bag closing machines that meet the needs of industry. Union Special equipment includes machines for closing bags of all types and sizes. Experience gained in handling bag closing problems in many different fields is your assurance of complete satisfaction. Ask for recommendations on your particular problems. Literature on request.

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Bag Closing Machines

The minute electric current is amplified a thousandfold to produce power to operate the remote instruments.

Flow rates encountered in laboratory or pilot plant operations as well as the small industrial flow rates of such products as essences, vitamin additives and inhibitors, can be accurately and reliably recorded, controlled and totalized.

Thermostats and Pressure Switches 18

United Electric Controls Co. has just published a catalog consisting of 14 bulletins, seven of which give information on various types of thermostats. The other seven bulletins cover various types of pressure switches. Each bulletin, in addition to describing the particular model of control equipment, gives specific applications, its limitations, and special features.

Materials Handling Equipment

Lift Truck 19

A 4-page bulletin, describing and illustrating a fork truck, called "Palletier," has been released by Crescent Truck Co. Photographs show the truck hoist lifted and tilted backward, 13 deg., tilted forward, 5 deg., and in other positions that the truck can assume in use. Specifications of the various models are given. A drawing, showing the various dimensions of the more important parts of the truck, is included.

Industrial Logistics 20

Effective methods for handling materials and manufactured products economically and safely are outlined in a 12-page illustrated booklet entitled "Industrial Logistics," recently issued by Elwell-Parker Electric Co., Cleveland, Ohio. The booklet describes means of assembling standardized sizes of individual containers in master unit loads on pallets or skids and then transporting them by means of power industrial trucks.

Pumps 21

Axial flow pumps, for capacities up to 100,000 g.p.m. and heads to 50 ft., are covered in Bulletin G-845, released by Economy Pumps, Inc. Recent developments and improvements in efficiencies are described. Both propeller and mixed flow impellers in all capacities are described and illustrated. Typical installations to provide protection against floods for large buildings and industrial plants are also described and illustrated by means of line drawings.

Conveyor Service 22

Lamson Corp., in a 34-page booklet, profusely illustrated, records the contributions made by it to the winning of the war. Numerous parts and products vital to the war effort are described. This booklet conveys a good picture of how Lamson can be of service to peace-time business.

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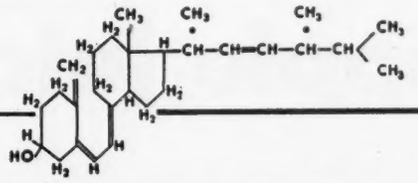
Calciferol is the name applicable *only to the superior, pure crystalline product* as so recognized and used throughout the world.



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OTHER WINTHROP PURE SYNTHETIC VITAMINS:

- **TRIDEE**—Winthrop's Brand of vitamin D_3 in Corn Oil
- **VITAMIN B_1** (Thiamine Hydrochloride)
- **VITAMIN B_2** (Riboflavin)
- **NIACINAMIDE**
- **VITAMIN B_6** (Pyridoxine Hydrochloride)
- **CALCIUM PANTOTHENATE**
- **VITAMIN C** (Ascorbic Acid)
- **AMINO-ACIDS**
  - Valine
  - Cystine
  - Tyrosine
  - Leucine
  - Glutamic Acid
  - Tryptophane
  - Phenylalanine
  - Methionine
- **"B-E-T-S"**—Winthrop's Brand of Bread-Enrichment Tablets
- **"VEXTRAM"**—Winthrop's Brand of Flour-Enrichment Mixture

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Crystalline Form in vials of one, five, and ten grams.

Solution in Corn Oil: 1,000,000 U.S.P. Units per gram* packed as follows:

400 Standard Units	2,500 Standard Units
1,000 Standard Units	50,000 Standard Units

Also Solution in Corn Oil: 400,000 U.S.P. Units per gram packed as follows:

250 Standard Units	1,000 Standard Units
500 Standard Units	20,000 Standard Units

*Standard Unit=1,000,000 U.S.P. Units

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

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QUALITY CONTROL

Predicting Egg Solids

SOLIDS in liquid eggs may be predicted rapidly by the use of a sugar refractometer. Another quick method which may be used as a rough check is specific gravity determined by a hydrometer. In this method the eggs are mixed with an electric mixer running at low speed. Specific gravities range from 1.000 to 1.070. Relationship between total solids by the A.O.A.C. vacuum oven technic and specific gravity is linear, but the error of prediction is ± 1.3 percent. It is unsatisfactory for frozen eggs, as a uniform sample cannot be obtained which is free from air.

In the refractometric methods, the eggs are treated with trypsin or ammonium hydroxide, the latter method being simpler and more satisfactory. With the usual laboratory refractometer, the error of prediction of total solids, when using the ammonium hydroxide treatment, was ± 0.43 percent. A simpler, portable, direct reading sugar refractometer has been adapted to solids determinations in liquid eggs, either fresh or frozen. Although a different relation exists between refractive index and solids content for fresh and thawed frozen eggs, this refractometer offers a rapid, convenient and inexpensive method for determining egg solids with an error of prediction of about ± 0.5 percent.

Digest from "Liquid and Frozen Egg. II. Methods of Determining Solids Contents of Liquid and Frozen Eggs." by C. G. Lavers and J. A. Pearce, *Canadian Journal of Research*, vol. 24F, 183-190, May, 1946.

DEHYDRATION

Oxygen in Dried Milk

KEEPING quality of dried milks is greatly increased by reducing the oxygen content of the container atmosphere to 3 percent or less. The fact that the skim milk solids release absorbed oxygen slowly makes the meeting of this requirement more difficult than it would at first seem. One solution is to evacuate in stages with intervening holding periods to allow desorption to take place. A relatively high efficiency of a second evacuation stage in decreasing the percent oxygen content is indicated. Since the rate of desorption seems to vary with different dried milks, the efficiency of gassing procedures should be established for the product concerned in each case.

In the authors' experience, the use of two stages of evacuation at 3 mm. pressure with a 3 to 4 day intervening holding period will produce a final oxygen concentration in the container of approximately 1 percent. Increasing the duration of the holding period will reduce further the final oxygen concentration.

Digest from "The Oxygen Content of the Atmosphere in Containers of Dried Milk Packed in Nitrogen," by P. S. Schaffer and G. E. Holm, *Journal of Dairy Science*, vol. 29, 207-212, April, 1946.

Storage of Dried Eggs

DETERIORATION of dried whole eggs during storage has been ascribed to such factors as pH of eggs before drying, oxidation, moisture content and storage temperature. The effects of moisture content, acidulation before drying, and storage in carbon dioxide and nitrogen atmospheres on palatability were measured on dried whole eggs stored at 80 and 100 deg. F. for periods up to 16 weeks.

As measures of changes, the authors used palatability scores, fluorescence value of a 10 percent sodium chloride extract, solubility in 10 percent potassium chloride solution, and pH of samples reconstituted for cooking.

The dried eggs were prepared from frozen eggs to have moisture contents of 4.7, 3.0 and 1.7 percent. The eggs of 1.7 percent moisture maintained their palatability better than the higher-moisture samples when stored at 80 deg. F. and were acceptable after 64 weeks' storage. A peculiarity of the palatability score curves is that all samples were considered inedible after 8 weeks and then underwent improvement. The other quality indexes also showed better values for low-moisture eggs. At the higher temperatures all the samples deteriorated in palatability to below the edible level in about 8 weeks, but comparatively the low-moisture eggs scored better on all the quality index.

Acidification of liquid egg to pH 6.7 and drying to 1.7 percent moisture afforded no protection against quality deterioration.

Packing eggs in CO_2 (1.7 percent moisture) resulted in improved quality over storage in air for eggs stored at 80 deg. F. The effect on solubility was most pronounced, eggs stored in CO_2 being much more soluble than those stored in nitrogen or air. At 100 deg. F. all samples rapidly dropped below the acceptable palatability level but on a comparative basis those stored in carbon dioxide had better scores than those stored in nitrogen or air. Nitrogen storage was usually slightly better than air storage, but generally the differences were not significant.

Digest from "Dried Whole Egg Powder XVIII. The Keeping Quality of Acidulated, Gas-Packed Powders of Low Moisture Content," by J. A. Pearce, M. Reid and W. H. Cook, *Canadian Journal of Research*, vol. 24, sec. F., 39-46, January, 1946.

SUGARS and SYRUPS

Defecation of Sirups

PRESSURE filtration of phosphoric acid-lime defecated refinery sirups using diatomaceous filter aids is now possible with pipe line defecation. The success of filtering phosphate-defecated liquors depends largely upon the avoidance of breakdown of the calcium phosphate floc through mechanical action, such as centrifugal pumps. Recent laboratory tests have shown that it is possible to introduce the acid and lime beyond the pump and thus defecate in the pipe line in which the unfiltered liquor

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The 2½″ diameter roller with sealed heads and 22SH Bearings resulted from considerable effort over many years toward developing a really sanitary dairy conveyer roller. It can be washed down with water or steam, and is designed for application under wet conditions. 4″ channel frames are used with this roller, the rollers being held in place in the frames by lockbars. There is a Mathews Engineer operating in your vicinity. He will give you complete information about Sanitary Roller Conveyer for cases and cans, and will also tell you about the many other types of Mathews Conveyers which have been engineered to serve production.

MATHEWS CONVEYER COMPANY
ELLWOOD CITY, PENNSYLVANIA
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ENGINEERING OFFICES IN PRINCIPAL CITIES

flows to the presses. The availability of several metering and proportioning devices and also pH control systems make it possible for the refiner to install this method of treatment with little change in press room layout. Addition of the phosphoric acid first, followed by the lime slurry, shows best results on cycle lengths, clarity of filtrate, color, and lime salt removal. Selection of filter aid for percentage of defecant is discussed. Charts and tables on clarity, color and performance are given.

Digest from "Defecation of Refinery Sirups," by G. G. Halvorsen and A. R. Bollaert, *Industrial and Engineering Chemistry*, vol. 38, no. 4, 385-389, April, 1946.

Non-Bitter Corn Sirup

A PROCESS of manufacturing a starch conversion sirup of notable sweetness and no discernible bitterness is the subject of a recent patent. In this process, an aqueous starch suspension is subjected to acid hydrolysis until the dextrose equivalent content is more than 50 percent, but less than enough to cause crystallization upon standing. The conversion solution is neutralized to between pH 7.0 and pH 9.0, where it is held at a temperature between 150 deg. F. and boiling for a period not substantially exceeding 30 minutes. Acid is added to reduce the pH to between 4.5 and 5.0. Thereafter clarifying and, if necessary, evaporation may be carried out in the customary manner.

Digest from U. S. Patent 2,395,907, issued March 5, 1946, on an application dated May 28, 1942, to G. T. Peckham, Jr., and assigned to Clinton Company, Clinton, Iowa.

PACKAGING

Penetration of Wrapping Materials by Molds

MOLD penetration and growth and the effect on water vapor transmission have been measured on 20 varieties of package wrapping sheet materials. Included were 5 varieties of cellulose films, 5 types of waxed wrappers, 9 laminated sheets made up of cellulose films, metal foils, and kraft papers in various combinations, and Pliofilm in a single layer. After dusting with mold spores of several genera the samples were incubated in a mold-infested cabinet at 95 deg. F. and 95 to 100 percent relative humidity. Samples were tested, after 1, 2, 4 and 8 weeks' incubation, by measuring water-vapor transmission at a vapor pressure differential of 26 mm. of mercury and a dry bulb temperature of 80 deg. F.

Cellulose films were only slightly

(*Turn to page* 192)

# of food fortification?

We publish herewith statements from the American Medical Association and from the American Public Health Association regarding fortification of foods

OCCASIONALLY a food manufacturer asks us: "What do health associations say about food fortification?"

So that you may have at hand a record of what they have said, we give you the two following items:

In *August, 1939**—the American Medical Association's Council on Foods issued this statement and in 1945* reaffirmed its position: "The Council on Foods desires to encourage the restorative addition of vitamins or minerals or other dietary essentials in such amounts as will raise the content of vitamin or mineral or other dietary essential of general purpose foods to recognized high natural levels; with the provision that such additions are to be limited to vitamins or minerals or other dietary essentials, for which a wider distribution is considered by the Council to be in the interest of public health."

The Council approved "as being in the interest of the public health" fortification, within specified limits, for milk with vitamin D, margarine with Vitamin A, table salt with iodine, and cereal products with calcium and iron. In the discussion leading to this resolution, a sharp distinction was drawn between *fortification* and *restorative additions of nutrients.*

In *October, 1944**—The American Public Health Association adopted, and later published, a resolution. That resolution states, in part: "The American Public Health Association goes on record as favoring appropriate state and federal action to perpetuate the benefits that have accrued to the national dietary through the enrichment of staple foods in accordance with the recommendations of the National Research Council."

Standard Brands Incorporated has spent much time and research in recent years developing products for vitamin B complex, vitamin D and protein supplementation of foods. These products are known for their dependability and uniformity.

If you are now seeking ways of fortifying your company's products, we invite you to discuss your needs in confidence with one of our executives.

Products containing
VITAMIN D

Fleischmann's Hy-Dee
Irradiated Dry Yeast

Fleischmann's Irradiated Dry Yeast
Type 700-H

Standard Brands Viosterol
(Activated Ergosterol) Steenbock Process

Products containing
NATURAL B COMPLEX FACTORS

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Pure Dry Primary Yeasts *(Brewer's Strain)*

Fleischmann's
Bee-Flex Products

Fleischmann's
Brewer's Yeast Extract Types 3 and 41

Fleischmann's
Yeast Extract and Liver

**Journal American Medical Assn., August 19, 1939*
**Journal American Medical Assn., September 29, 1945*
**American Journal of Public Health, December, 1944 (Volume 3412, page 1298)*

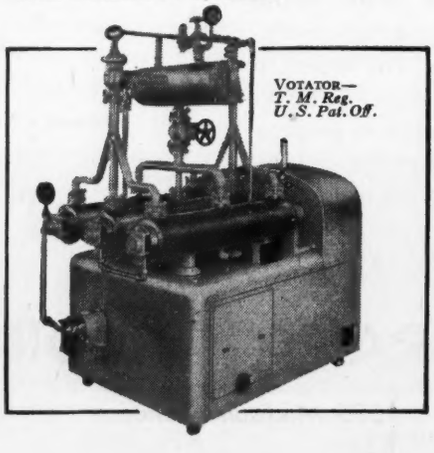
STANDARD BRANDS INCORPORATED

Pharmaceutical Division • 595 Madison Avenue • New York 22, N. Y.

MARGARINE, shortening, lard, eggs, wine, fruit puree, starch paste—to the growing list of foods being processed more efficiently with the continuous, closed VOTATOR system, add Plastic Cream.

Under sanitary, controlled conditions, a VOTATOR unit processes this important new dairy product in less than half the floor space required by conventional equipment. Chilling and plasticizing are accomplished in seconds as the cream flows through the machine. Refrigeration costs are literally kept at the minimum. Problems of packaging and storage are simplified because the Plastic Cream comes out of the VOTATOR "set up" and ready to go.

Write to The Girdler Corporation, Votator Division, Dept. FI-7, Louisville 1, Kentucky. District offices: 150 Broadway, New York 7, N. Y.; 619 Johnston Bldg., Charlotte 2, N. C.; 2612 Russ Bldg., San Francisco 4, Calif.



THE Votator
A GIRDLER PRODUCT

attacked by molds, except where lacquer coatings were cracked in sealing. Transmission of water vapor increased, however, probably because of effect of the severe storage conditions on the lacquer sealing material. Duplex and triplex films were less affected. Abundant mold growth occurred on wax impregnated or wax-coated materials and water-transmission values increased when wax peeled from the surface of sheets.

Laminated materials having a metal foil layer stood up well even though molds grew abundantly on the nonmetal layers. The tests indicated this type of material as desirable for severe conditions of temperature and humidity. One of the best of this type was a vinyl-film laminated to both sides of 0.001 in. aluminum foil. It supported very little mold growth, delaminated only slightly and showed very little change in water-vapor transmission value. Pliofilm also showed only slight mold and little change in water-vapor transmission during the 8 week test period.

Digest from "Packaging III. Effect of Mold Growth and Ageing on the Water-Vapor Transmission of Packaging Materials," by C. G. Lavers and W. I. Illman, *Canadian Journal of Research*, vol. 24F, 117-122, March, 1946.

VITAMINS

Ascorbic Acid Loss In Frozen Strawberries

FROZEN strawberries retain the greater part of their initial ascorbic acid content during frozen storage and normal defrosting. Pureed berries also keep well, and better if sugar is added to the puree. Fresh mature strawberries have an ascorbic acid content of not over 80 mg. per 100 g. Such fruit, three months after freezing, averaged 66 mg. Immature berries averaged 91 mg. and overmature berries, 55 mg. These berries were frozen in sirup. Sliced berries contained more than 57 mg. of ascorbic acid per 100 g. on sugar-free basis.

Whole or sliced berries frozen without added sugar or sirup did not lose ascorbic acid during freezing, but with sirup or dry sugar lost 10 to 15 percent. Whole berry water packs lost about 20 percent. Pureeing or flash pasteurization did not reduce ascorbic acid over 5 percent.

During storage at –10 deg. F. for up to 15 months, losses extended from 12 to 14 percent. If defrosting is slow or strawberries are held several days at low temperatures after defrosting, ascorbic acid losses may be much greater than those incurred

Make richer food products and cut costs

If you are a manufacturer of pancake mixes, cake mixes, muffin mixes, doughnut mixes and other ready-prepared mixes, try Staley's Soy Flour as an added ingredient. You'll find this outstanding product will help you increase the richness of your products—and cut costs at the same time!

Soy flour is recognized as one of the world's best sources of high-quality protein—protein rich in essential amino acids. It is also an abundant source of essential B vitamins (thiamin, riboflavin, niacin) and supplies important minerals—calcium, phosphorus and iron.

Soy flour actually offers a combination of advantages not found in other ingredients. Manufacturers of ready-prepared flours and mixes, breakfast foods, macaroni, noodles—also bakers, confectioners, and others have found this excellent product of real value as an added ingredient.

Write in for full information regarding the advantages soy flour offers in your particular field.

Mail in the coupon below. We'll be glad to discuss your specific problems with you

A. E. STALEY MFG. CO.

Industrial Sales Division, Decatur, Illinois

STALEY'S HI-FAT SOY FLOUR ★ STALEY'S LO-FAT SOY FLOUR

Canadian Representative:
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A. E. Staley Mfg. Co., Dept. FI-7
Decatur, Illinois

Gentlemen: Please send me information on the following uses of soy flour:

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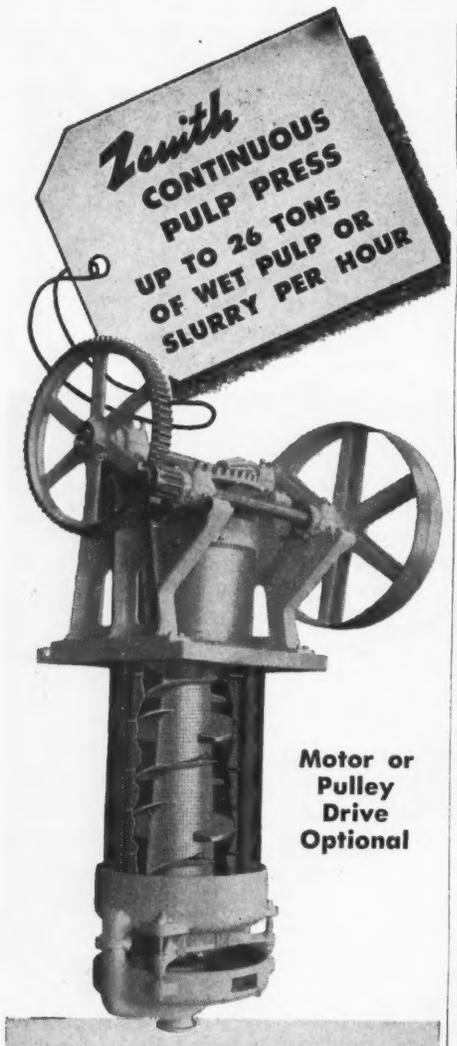

The Zenith Pulp Press, with capacity up to 26 tons per hour, thoroughly dewaters wet pulps and slurries such as:

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Heavy screw-type spindle applies smooth, continuous pressure, forces pulp or slurry against selective resistance. Rifled drilled resistors permit use of steam when necessary. Minutely perforated screens assure efficient drainage, hold pulp losses to minimum. Ball thrust bearings and oversize shaft bearings reduce power load.

New uses for the remarkably efficient, profitable Zenith Pulp Press are being constantly developed. An experimental press is available for trial in your plant.

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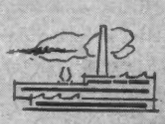

JACKSON & CHURCH CO.
SAGINAW, MICHIGAN

during the freezing and frozen storage processes. Sliced berries suffer greater losses in defrosting than whole berries. Purees suffer no significant loss if defrosting takes place at 35 deg. F. in 24 hours. If as long as 96 hours are required, sugared purees lose 26 percent and unsugared purees 39 percent of their ascorbic acid contents.

Sugared puree loses about 5 percent of its ascorbic acid and unsugared about 12 percent in making Velva Fruit dessert.

Digest from "Retention of Ascorbic Acid in Strawberries During Processing, Frozen Storage, and Manufacture of Velva Fruit," by H. J. Loeffler, *Food Research*, vol. 11, 69-83, January-February, 1946.

ENGINEERING

Fish Unloading Method

APPARATUS for unloading a cargo of fish from a vessel by a hydraulic system in such a way as to prevent damage and spoilage, is the subject of a patent recently granted. The apparatus consists of a large capacity, low pressure, electrically driven centrifugal pump, which is suspended from a dock, or supported on the bottom of the sea. The suction side of the pump is connected by a large diameter (10 to 12 in.) pipe to a hose that reaches into the hold of the vessel. On this pipe are installed a check valve, necessary T's and gate valves. One valve is arranged to permit priming with sea water when the pump is suspended under water, another is connected with a source of water under pressure for priming when the pump is above water level.

Two means are suggested for providing substantial volumes of water to the fish in the hold; a seacock in the hull and one or more hoses connected with a source of water under pressure. From the discharge end of the pump a vertical pipe leads, preferably to the second story of the packing house or cannery, where the discharge empties onto a specially constructed screen. In order to reduce the velocity of the discharge and prevent damage to the fish, the vertical pipe is connected at its upper end to an angularly disposed pipe section of enlarged diameter.

In operation, after a substantial volume of water has been introduced into the hold of the vessel, the pump is started with the priming valve open. When the pump is delivering a full stream of water through the discharge pipe the gate valve in the pipe leading to the hose is slowly opened and the priming valve partially closed. This creates a suction on the hose, with the result that the

CASE HISTORY No. 6

One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON

(Computed from cost figures of year 1943 using 25 acre production as average per harvesting unit per 12 hour day and an average barley yield of 20 bags an acre.)

	100 Lb. Jute Bags	100 Lb. Sewn Multiwall Paper Valve Bags
Bag Cost per M	$245.00	$87.18
Bag Cost	.245	.0871
Bag Cost Per Acre (20 bags per acre)	4.90	1.7420
Labor Cost Per Acre	1.65	.7332
Total Bag and Labor Cost Per Acre	$ 6.55	$ 2.4752
Saving Per Acre Paper Over Jute		4.07

DETAILS OF LABOR COSTS

Jute Bags	Per Day
1 Harvester Operator	6.50
1 Swamper (Filling and preparing bags for sewing)	4.00
2 Sack Sewers at $5.50	$11.00
1 Tractor Driver	4.75
Sack Bucking (at $.60 per acre) (Picking up scattered sacks from field)	15.00
Total Labor Cost Per Harvester	$41.25
Labor Cost Per Acre Jute Bags	$ 1.65

Multiwall Paper Valve Bags	Per Day
1 Harvester Operator	$ 6.50
⅓ Truck Driver (Transports bulk trailers for 3 harvesters) at $4.75	1.58
1 Man Packing	5.50
1 Tractor Driver	4.75
Total Labor Cost Per Harvester	$18.33
Labor Cost Per Acre Paper Bags	.7332

1946 Crop (Estimated)

3,500 Acres Wheat
3,100 Acres Flax
6,600 Acres Total

$4.07 Saving per acre paper over jute

$26,862 Total saving paper over jute 1946 crop.

BICARBONATE OF SODA
MOULDING POWDERS
OYSTER SHELL GRITS
CALCIUM CHLORIDE
LIME
CLEANING COMPOUNDS
FLOUR
INSECTICIDES
QUICKLIME
SUGAR
FERTILIZERS
COTTONSEED MEAL
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TALC
CEREALS
PLASTER
ANIMAL FEEDS
ASPHALT
DOUGHNUT
SYNTHETIC RESINS
MILK, DRY, POWD
SOYA BEAN FLOUR
RUBBER, SYNTHETIC
INSECTICIDES
LIME
PEANUTS
CEMENT
SODA ASH
SALT
STARCH
SALT
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ROSIN
RICE
QUICKLIME
PLASTER
MILK, DRY, POWD

ANOTHER RECORD IN ST. REGIS PACKAGING EFFICIENCY AND FLEXIBILITY

California Grain Grower Saves $4.07 Per Acre with Multiwalls

This sixth in a series of Multiwall Case Histories tells how Murietta Farms in California made drastic savings in the packaging of barley, wheat and flax by changing over to St. Regis Multiwall Paper Valve Bags and Machine Packaging.

When jute bags became scarce in 1942, Mr. Giffen, operator of Murietta Farms, investigated the advantages and economies of Multiwall Bags and installed a St. Regis system tailor-made for his requirements — *here are the highlights:*

66⅔% SAVING IN BAG COSTS: Multiwalls cost only 8½¢ each as contrasted with 24½¢ for burlap bags. In addition, Multiwalls, with their multiple layers of tough kraft paper, offered positive protection against the elements.

56% SAVING IN LABOR COSTS: By installing gravity-type packers and using Multiwall Paper Valve Bags, it was possible to eliminate the men formerly required to sew fabric sacks. In addition, the system made it possible to fill the bags at a central spot . . . eliminating the tiresome and costly collecting of sacks scattered over the fields.

MULTIWALLS SAVE CROP STORED IN OPEN FOR 6 MONTHS: During the harvesting seasons of 1944 and 1945, it was necessary to leave the filled Multiwall bags in the open for six months . . . from the end of harvesting until late in November. The grain in the Multiwalls remained in perfect condition. Mr. Giffen estimates that between ⅓ and ½ of the crop would have been lost through exposure if the grain had been packed in burlap.

EVEN GREATER SAVINGS IN '46: Figures for the 1946 crop indicate that Mr. Giffen will effect a saving of approximately $26,862. This is based on an average saving of $4.07 per acre through the use of paper instead of jute in the packaging of 3,500 acres of wheat and 3,100 acres of flax.

Multiwall Paper Valve Bags being filled from spouts on trailer.

Filled bags stacked at edge of field; no protection against the elements supplied or required.

MULTIWALL

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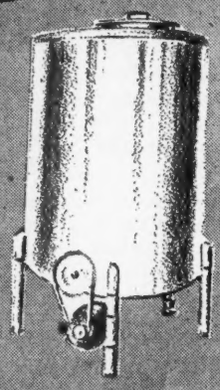

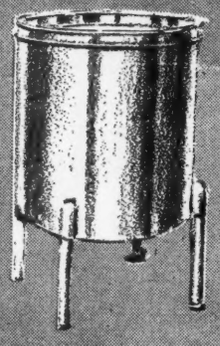

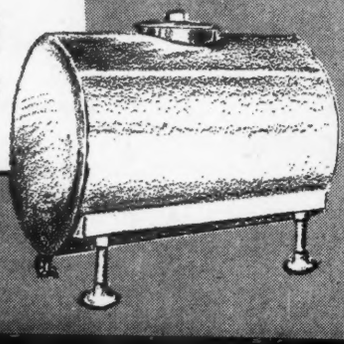

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MANY MONEY-SAVING FEATURES—

San-I-Tanks have special self-draining features with specially formed bottoms sloping to the front. Engineered to give maximum performance and many years of extra use—meaning savings for you—all at no higher cost. Designed primarily to meet EVERY storage or processing need—you will find the San-I-Tank complete in every detail.

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San-I-Tanks are made in a wide variety of sizes, shapes and capacities. By manufacturing a so-called "standard line" we can increase our tank production and pass on the savings made to you. If you need a tank get our complete catalog first and in most cases you will find the tank that will exactly meet your requirements.

SPECIAL TANKS—
Consult Our Engineers

For your convenience we have available a complete engineering service to design and recommend the best tank for use where a standard San-I-Tank will not meet your requirements. If you have a special tank problem send us the data, and let our staff solve it for you.

WRITE for Detailed Information about these TANKS . . .

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BELDING, MICHIGAN Dept. r1

fish and water in which they are immersed start to flow through the hose to the large pipe where the fish join the stream of water from the priming valve. By properly adjusting these valves an extremely accurate blending of fish and water flowing through the pipe may be effected. This is important in preventing damage to the fish as they flow through the pipes and pump. At the upper end of the discharge pipe the fish and water are discharged against the bars of the special screen and the fish flow through sluiceways to storage tanks.

An additional claim of the patentee is that substantially all of the scales are removed from the fish while they are moving through the conduits.

Digest from U. S. Patent 2,396,305, issued March 12, 1946, on an application dated October 7, 1943, to J. D. Toft, South Portland, Maine.

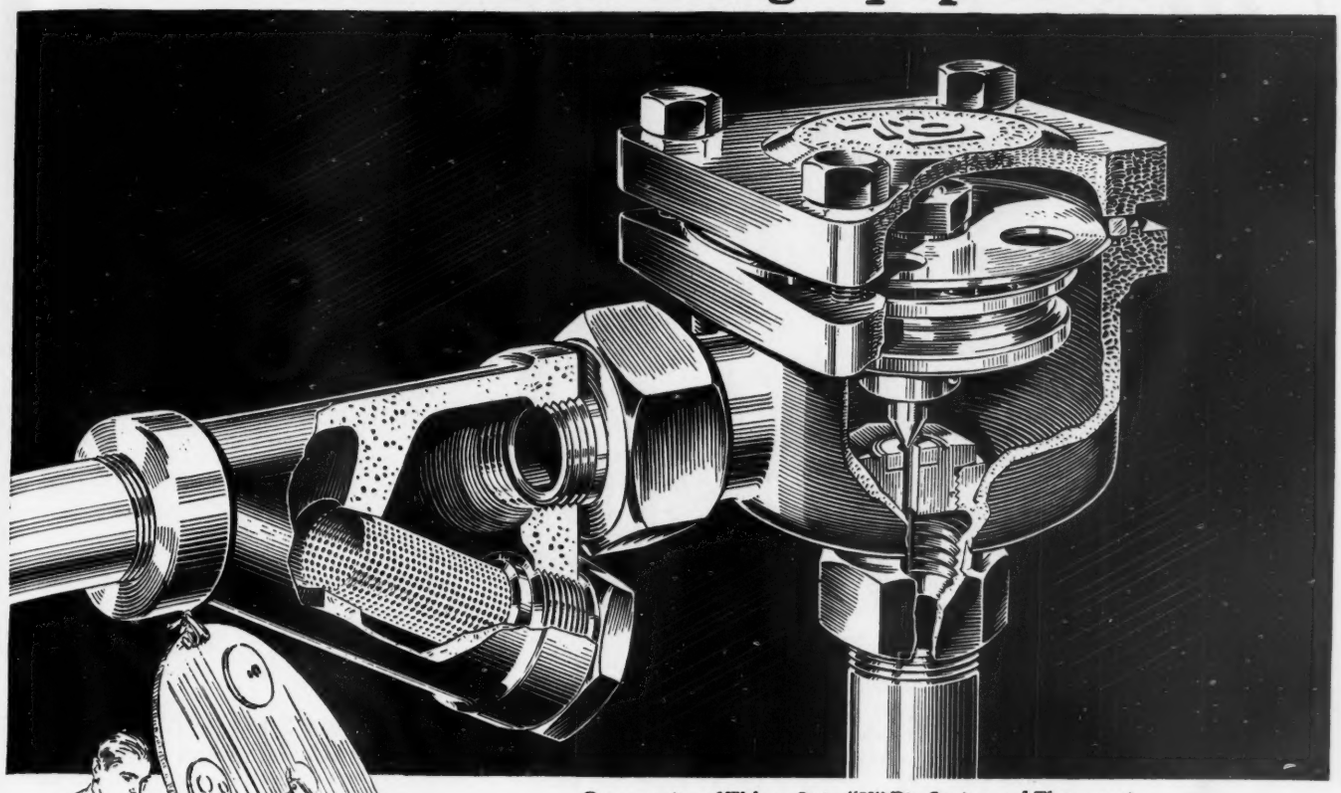
DAIRY

Stability and Viscosity Of Cream-style Foods

INGREDIENTS of milk-containing foods that affect their heat stability and viscosity are: the fat and protein of the milk, the starch of flour added as thickener and binder, the salt and the type of vegetable or flavoring material that is added.

Dried milk and dried whey of various types were used in the manufacture of cream soups and similar foods. Preliminary experiments showed that the heat stability of spray-dried milk was not significantly changed by the drying process. However, the heat-treatment previous to spraying largely determined the heat-stability of the powder. When reconstituted to 9 percent solids, the skim milks that received the most drastic heating were the least stable. Fresh milk, cream and whey or the concentrated forms of these products were well adapted to use in cream-style foods. Their heat-stabilities were governed by processing steps commonly employed in the concentrated milk industry. The heat-stability characteristics of a milk product were important, however, only in the simpler mixtures. Coagulation was unavoidable in cream soups and other products that contained destabilizing ingredients such as wheat flour, potato starch, tomato, onion, celery, pea and cabbage extracts, tomato pulp and inert material. The problem was one of controlling the kind of curd that formed rather than in preventing its formation. Factors contributing to

"Increased Production from Process Steam-Using Equipment"



Cut-away view of Webster Series "78" Dirt Strainer and Thermostatic Process Steam Trap as used in food processing equipment applications.

Webster Series "78" Strainer and Trap applied to steam-jacketed kettle. America's leading food processing plants use Webster Traps and Strainers on kettles, vacuum pans and flash sterilizers.

"Our old traps were allowing air to mix with the steam and causing slow heating-up so we switched to Webster Traps. Now we get increased production and use less steam."

Webster Series "78" Thermostatic Traps assure quick, continuous and complete discharge of both air and condensation. No air-binding. No water-logging. No time loss in heating-up.

Webster Series "78" Thermostatic Traps are not just an adaptation of low pressure design to high pressure duty. They have been developed from the ground up for operation at process pressures. When large volumes of condensation are involved use the Webster Series "26" or "79" Float and Thermostatic Traps.

Webster Series "78" Dirt Strainers, placed ahead of process steam traps, protect trap interiors from core sand, pipe scale or sediment. Savings on trap repairs soon pay for the original cost of the Strainers.

When you have trouble with steam heating equipment, check with your heating contractor. For data on capacities, ratings, operation and application of Webster Series "78" Thermostatic Traps and Dirt Strainers, send for Bulletin B-1200F. Address Dept. FI-7.

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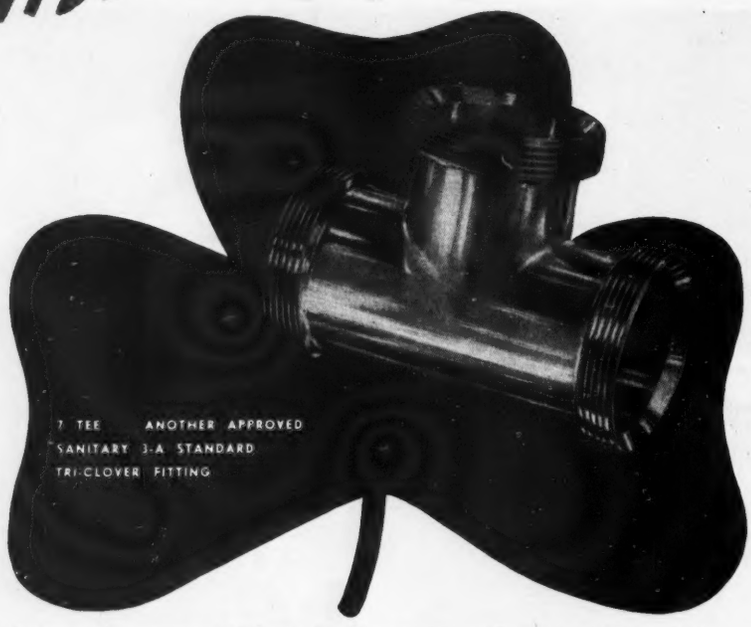
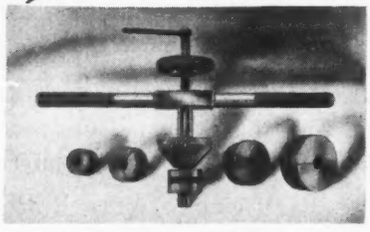


Every fitting, valve, pump and foot of tubing your products pass through is a potential "Sanitation" bottleneck. Wartime abuse of your process lines may have developed cracks, crevices or corrosion. Your "Quality Uniformity" is subject to failure from harmful bacteria that may develop in these flaws. Frequent inspections of your processing lines may nip costly trouble before it develops. Tri-Clover is now on a stepped up production schedule to meet your requirements. Your product is protected by the exclusive Tri-Clover "Quality Controlled Production", flawless fabrication and serviceability of Stainless Steel and Tri-alloy fittings... Check your requirements and order your needed replacements from your Tri-Clover Jobber today.

New SUPER SPEED TOOLS NOW AVAILABLE

Every dairy man, bottler and food processor should own these two new Super Speed Tools. Cut maintenance and installation costs by doing the job yourself. Tri-Clover's new catalog 346 illustrates the complete set of new Super Speed Tools.



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A new and efficient High Speed Seating Tool with many exclusive and carefully designed features. Special hardened tool steel used throughout. Tantung carbide cutting blades that give long and trouble free service. Blades arranged to automatically face chips. Cutters reversible for inside or outside bevel. Perfect seating is assured.

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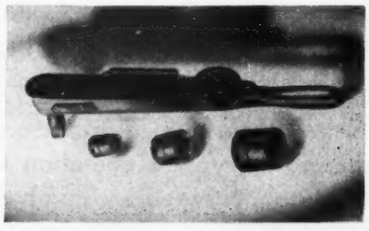

SUPER SPEED TORQOMETER

Even veteran mechanics cannot be expected to guess correct expansion...or estimate even close to uniform accuracy the amount of torque required to expand tubing into ferrules properly...But with a Super Speed Torqometer the most inexperienced worker can expand tubing to the exactness required...Right to the correct inch pounds... and do it swiftly and confidently. He sees the correct torque as easy as reading a watch.

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the production of a smooth, heavy-bodied product were: use of optimum quantities of starch and flour binders to take up moisture expressed by the casein; comminution of inert pulp and fibrous material by homogenization; sterilization with a minimum of agitation during the period when a coagulum was forming; maintaining maximum heat stability characteristics in the milk ingredients and substitution of whey protein for milk protein when coagulation of the casein in a product was excessive. Satisfactory formulas for cream-style soups included 3 to 4 percent milk-solids-not-fat, 2 to 4 percent milk fat, 2 to 3 percent corn starch or flour, about 1 percent salt and the remainder vegetable extract, vegetable pulp and a soup stock.

Digest from "The Effect of Milk Products on the Heat-Stability and Viscosity of Cream-Style Foods," by B. H. Webb and C. F. Hufnagel, *Journal of Dairy Science*, vol. 29, 221-230, April, 1946.

Ice Cream Stabilizer

A STABILIZER and ingredient, which it is claimed will supply, at low cost, to an ice cream, good body, texture and viscosity, resistance to ice and lactose crystal formation, together with extremely rapid overrun, has been patented. The composition comprises adding as an ingredient to the mix a small amount of a polyhydric alcohol ester having at least one free hydroxyl group and the finely divided coarse fraction of dehulled oats. This to contain in excess of 20 percent total protein and a relatively low starch content as compared to dehulled oats.

Additional claims are: shortened agitation time and replacement of egg yolk.

Digest from U. S. Patent 2,395,061, issued February 19, 1946, on an application dated August 1, 1944, to Sidney Musher, and assigned to Musher Foundation, New York, N. Y.

MEATS

Compressibility of Meats

DEHYDRATED meat, prepared for shipment abroad, was compressed into small cylinders under pressures up to 750 psi. Loss of fat in pressing began at about 75 lb. for high fat (36 percent ether extract) samples, but there was no loss at 600 psi. for low-fat (27 percent ether extract) samples. High-fat samples attained maximum density at lower pressures than low-fat samples.

Small particle size contributed to higher density in the pressed product, as well as to holding of shape after compression. Products pressed

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..."IN THE DARK"

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LET HIM SEE WHAT HE'S BUYING

HE'S a big and brave fellow, until the Mrs. sends him marketing. Then he's alone in the dark—lost in a sea of merchandise. The most impulsive of impulse buyers, he snatches up whatever "looks good," planks down his cash and high-tails it for home.

The Mrs. is a far more deliberate buyer, a seasoned purchasing agent. But she's susceptible to whatever "looks good" too . . . and a ready buyer of the good things she can see.

That's why sparkling, clear Anchorglass Containers are gaining favor with food packers everywhere. They instantly display the colorful eye and appetite appeal of the contents and deliver your choice foods to the consumer without losing any of the original goodness packaged at your plant.

Anchorglass Containers impart no foreign tastes or flavors. They are safe and easy to open and can be tightly resealed to protect unused portions of food. They are convenient, sanitary and attractive packages that honestly reveal the nature and quantity of the contents at all times.

Anchorglass Containers offer you the solution to many of your packaging and merchandising problems.

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PRODUCTS OF
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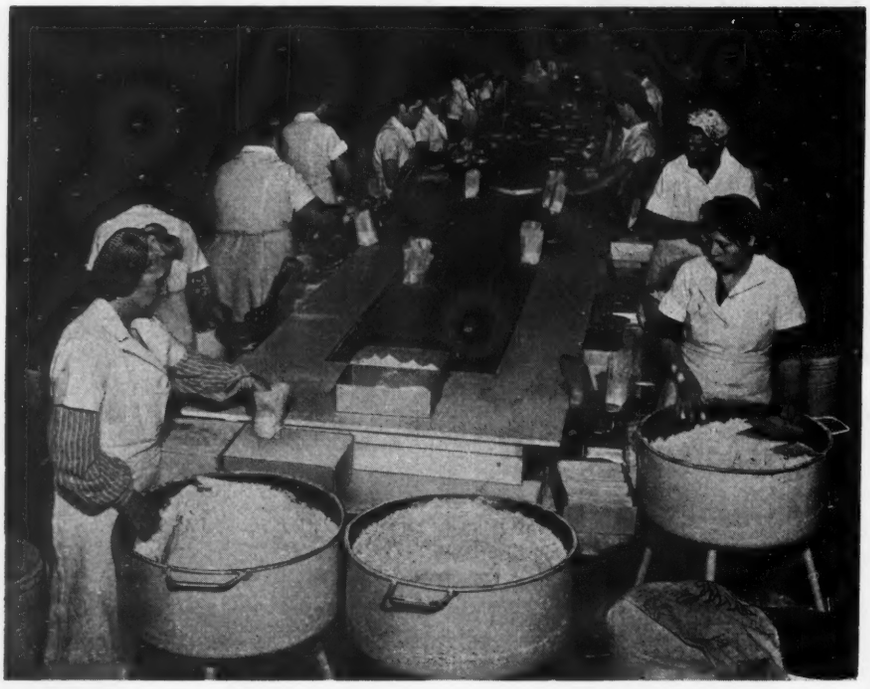

Six Tu-way EXACT WEIGHT Scales check-weighing "Aunt Ellen's" famous PI-DO packages in Dallas, Texas.

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A delicious, crispy pie and pastry crust mix in 8-oz. packages . . . "Aunt Ellen's" famous PI-DO. Flour, salt, shortening and lecithin are accurately and uniformly mixed and blended for the housewife who simply adds four tablespoons of water or milk, mixes and rolls for a 9-inch pie plate. No hit or miss packaging here, either. Every package is checked on Tu-way EXACT WEIGHT Scales for accurate weights for the consumer and profitable operation for the processor. This is a good example of a difficult packaging operation in mass production. We will be glad to advise you on how to best solve your food packaging problem from start to finish. Write for details today.

EXACT WEIGHT Scale (Model #233) Tu-way vision tower, compact (fits into any sound food production line.) Weighing platter or scoop to specifications of the operation. Dial 1 oz. over and underweight by ¼-oz. graduations. Capacity to three pounds.

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Exact Weight Scales

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at high pressure held more water on rehydration, apparently because more fat was expressed. Crushing of particles was a minor factor in rehydration capacity.

Temperature of pressing made little difference in the pressed blocks of meat with respect to density, but fat losses and rehydration capacity increase with pressure were less at a pressing temperature of 38 deg. F. than at 78 deg. F.

A density of 1.00 is desirable in the compressed product. At 78 deg. F. 50 to 500 psi. would be required to attain this density on the types of dehydrated meat studied, and 475 to 600 psi. at 38 deg. F.

Digest from "Compressibility of Dehyd ated Meat,' by H. B. Hetzer and O. G. Hawkins, *Food Research*, vol. 11, 32-38, January-February, 1946.

MISCELLANEOUS

Action of Propionates

UNDISSOCIATED molecules play the major role in propionic acid inhibition of mold growth. On a laboratory nutrient medium, inhibition of mold growth could not be directly related to the concentration of total propionate nor to the concentration of propionate ion. On the other hand, a relationship to the undissociated propionic acid molecule was shown. The critical concentration at which growth was completely inhibited was within the range of 0.0105 to 0.0106 moles undissociated propionic acid per liter.

The concentration of undissociated propionic acid is increased by increasing the acidity or by increasing the amount of propionic acid or its salts.

Digest from "Propionic Acid, Sodium Propionate, and Calcium Propionate as Inhibitors of Mold Growth. II. Studies Pertaining to the Active Agent Responsible for the Inhibitory Effect of the Propionates," by J. C. Olson, Jr. and H. Macy, *Journal of Dairy Science*, vol. 29, 173-180, March, 1946.

Algae Destroyed

PREVENTION of the growth or development of algae in water systems by the addition of water-soluble salts of primary aliphatic amines such as octadecylamine acetate, octadecenylamine acetate or dodecylamine hydrochloride is the subject of a recent patent.

It is claimed that a concentration of 25 ppm. of one of the above salts will rid a reservoir of algae within two weeks. The water is used in an atmospheric ammonia condenser.

Digest from U. S. Patent 2,393,293, issued January 22, 1946, on an application dated October 28, 1940, to H. M. Corley, and assigned to Armour & Co., Chicago, Ill.

BOOKS

Office Help

KNOW YOUR WHITE COLLAR WORKER. Published by the Labor Relations Institute, 1776 Broadway, New York 19, N. Y. 5½x8½ in.; 51 pages; paper. Price, $2.50.

The editors of this volume have aimed at prevention of unsettling relations among office workers, rather than their correction after they have developed. While many industrialists may feel they know most of the answers provided here, the book should help to point up a great many sore spots that are now being overlooked. The system outlined for maintaining complete records on each employee alone should make it useful to most personnel minded executives.

Art of Refrigeration

REFRIGERATION APPLICATIONS. Published by The American Society of Refrigerating Engineers, 40 W. 40th St., New York, N. Y., 1946. 6⅝x9⅜ in.; 190 pages; cloth. Price, $5.00.

The latest in a series, published bienially since 1932, this book departs from its predecessors in both title and contents. The earlier volumes, published as The Refrigeration Data Book, dealt with refrigeration theory, equipment and machinery while this one attempts to present the whole art of refrigeration.

As is to be expected with such a subject, food operations take up a sizable portion of the book. Under the editorship of such authorities as B. E. Proctor, D. C. McCoy, D. F. Fisher, Gerald A. Fitzgerald and Donald K. Tressler, four of the book's eight chapters deal with the various phases of food freezing and storage. Its thorough coverage of the general subject should be useful to the food engineer as well as the plant operator.

Foods Described

FOOD BUYERS' INFORMATION BOOK. By Alexander Todoroff. Published by The Grocery Trade Publishing House, 5247 Crystal St., Chicago, Ill., 1946. 5¾x8 in.; 380 pages; leatherette. Price, $4.00.

Few foods in today's market are missed in this book, which describes them in their various forms—fresh, canned, dried, etc.—and tells what the buyer should look for in most cases. It should be a handy reference book to keep within easy reach of food plant personnel, particularly those concerned with the buying and inspection of raw materials.

The book is richly illustrated with pictures of fruits, vegetables, spices, meat cuts and nut products, showing types and varieties.

Foremen and Up

THE FEDERAL LABOR LAWS. 6¼x9½ in. Price, $2.50. WHAT PRICE SUPERVISION. By R. D. Bundy. 5¾x9 in. Price, $2.00. Published by National Foremen's Institute, Deep River, Conn., 1946. Leatherette covers with gilt titles and spring bindings.

The first mentioned book is an attempt to give all the information a plant foreman should have on the Federal labor laws. Kept up to date, this loose-leaf book may well serve to avoid many minor disputes and prevent others from growing into major ones.

The second book is aimed more at top management. It outlines the value of adequate supervision in maintaining control of operations. There are few executives who would not find something worthy of serious consideration in this volume, particularly any who may be under the impression that their present methods offer no room for improvement.

The National Foremen's Institute was formed in 1917 as the Institute of Business Practice. Its purpose, through its 28 years, has been to supply both foremen and management with ideas and tools that would carry forward supervision programs. Its various publications carry out the Institute's expressed recognition of the foreman as the common denominator between capital and labor.

GOVERNMENT PUBLICATIONS

COLD STORAGE FOR APPLES AND PEARS. By W. V. Hukill and Edwin Smith. Department of Agriculture, Circular No. 740. Available from Superintendent of Documents, Washington 25, D. C. Price 15 cents.

CHANGES IN LEMONS DURING STORAGE AS AFFECTED BY AIR CIRCULATION AND VENTILATION. By E. M. Harvey. Department of Agriculture, Technical Bulletin No. 908. Available from Superintendent of Documents, Washington 25, D. C. Price 10 cents.

ESTABLISHING AND OPERATING A RETAIL BAKERY. Bureau of Foreign and Domestic Commerce, Industrial (Small Business) Series No. 29. Available from Superintendent of Documents, Washington 25, D. C. Price 35 cents.

THE RAPID RIPENING OF CHEDDAR CHEESE MADE FROM PASTEURIZED MILK. Processed leaflet BDIM-Inf-29. Available free on request to Bureau of Dairy Industry, Washington 25, D. C.

THE COOK BOOK OF THE UNITED STATES NAVY. Bureau of Supplies and Accounts, Navsanda Publication No. 7. Cloth bound. Available from Superintendent of Documents, Washington 25, D. C. Price $1.75.

PRODUCTION, CONCENTRATION, PROPERTIES, AND ASSAY OF THE ANTIBIOTIC, SUBTILIN. Mimeographed, AIC-106. Available free on request to Bureau of Agricultural and Industrial Chemistry, Washington 25, D. C.

LISTS OF PUBLICATIONS AND PATENTS ON CITRUS FRUITS AND PRODUCTS OF BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY. Mimeographed, AIC-96. Available free on request to Bureau of Agricultural and Industrial Chemistry, Washington 25, D. C.

GROUND WATER IN THE HIGH PLAINS OF TEXAS. By W. N. White, W. L. Broadhurst, and J. W. Lang. Geological Survey, Water-Supply Paper 889-F. Available from Suprintendent of Documents, Washington 25, D. C. Price 25 cents.

WATER LEVELS AND ARTESIAN PRESSURE IN OBSERVATION WELLS IN THE UNITED STATES IN 1943. Part 5. Northwestern States. By O. E. Meinzer, L. K. Wenzel, and others. Geological Survey, Water Supply Paper 990. Available from Superintendent of Documents, Washington 25, D. C. Price 45 cents.

DAMPNESS IN BASEMENTS AND GROUND FLOORS. By Richard S. Dill and Douglas E. Parsons. Letter Circular LC-813. Available free on request to National Bureau of Standards, Washington 25, D. C.

RESALE PRICE MAINTENANCE. Report of the Federal Trade Commission to Congress, Dec. 13, 1945. Summary of laws and interpretations. Available from Superintendent of Documents, Washington 25, D. C. Price $1.50.

QUALITY OF SURFACE WATERS OF THE UNITED STATES: 1943. With a summary of analyses of streams in Colorado River, Pecos River, and Rio Grande Basins, 1925 to 1943. By C. S. Howard and S. K. Love. Geological Survey Water-Supply Paper 970. Available from Superintendent of Documents, Washington 25, D. C. Price, 30 cents.

UNDERGROUND CORROSION. By Kirk H. Logan. National Bureau of Standards, Circular C450. Available from Superintendent of Documents, Washington 25, D. C. Cloth bound. Price, $1.25.

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Modern types of packaging machinery are endowed with speed, and personality too . . . and each machine demands a "uniform precision" carton . . . just the kind of distinctive "tailor made" cartons that Robert Gair has been creating and producing consistently for over eighty years . . . cartons that are ***GAIRanteed***.

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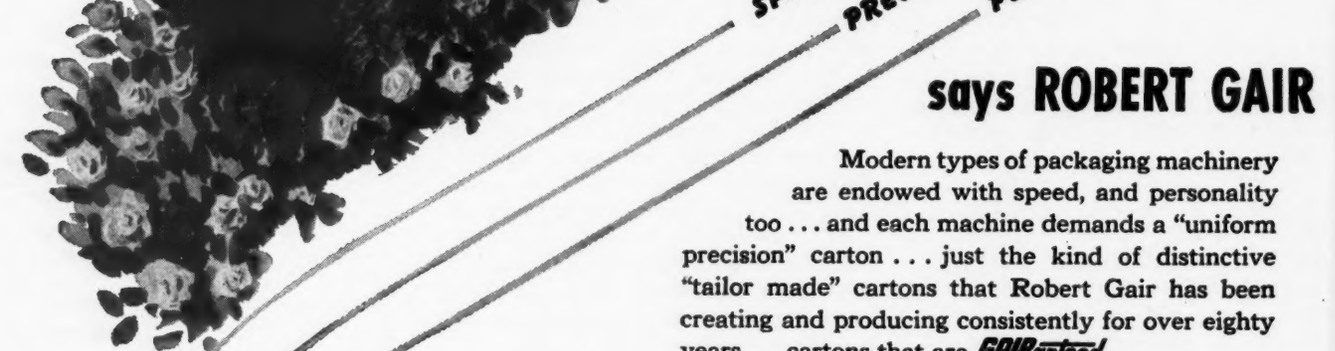

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Letters to the Editor

Freezing Should Be Weaned

To the Editor,
FOOD INDUSTRIES:

Your editorial on Quick Freezing in the May issue of FOOD INDUSTRIES was very interesting. As one who has been connected with this industry since its early days, I cannot resist the urge to point out several phases of the subject which you overlooked in your editorial.

Those of us who were brought up in the original Birdseye tradition have not been pleased with the constant deterioration of quality in recent years. As you know, none of us knew anything about the canning industry when this new method of food preservation was getting started. For example, we froze more than a million pounds of peas in Oregon that had been hand picked and hand shelled. I never did get the accurate cost figures on this pack but it must have been something!

Our ignorance of canning procedure had some fortunate results, however. For example, we used market garden variety of peas instead of the usual canning varieties and packed them field run instead of graded for size. I remember well a very capable canner pleading with me to pack the Surprise variety instead, maintaining that Laxtons and Telephones had too long vines for efficient vining.

Also, in our ignorance, we demanded earlier maturity on the vegetables we froze and a considerably higher standard of plant sanitation. Both of these factors were fought bitterly by every cannery executive who packed under contract for us. For example, the proper stage of maturity on whole-kernel, sweet corn for freezing is about 2 to 3 days before that required for canning whole kernel, but just try and get any cannery superintendent to bring corn into the factory at that stage.

Specifically, my complaint is that standards have been lowered gradually to the point where much of the product frozen barely grades standard. As you so carefully point out, freezing is the most expensive form of preservation. In the long run, it is foolish to put an expensive operation on inferior raw materials.

I would like to see the frozen food industry get back on the right track instead of aping the cannery trade. The frozen business is no longer an infant and it is time for it to be weaned. As you are well aware, the leaders in the frozen food industry are dominated by those steeped in cannery tradition. You might as well expect railroad officials to advance the technic of operation of a bus company.

Another factor that has not helped matters is the fading out of some of the varieties of fruits and vegetables best suited to freezing. For example, the Klondyke variety has been replaced to a great extent by the Blakemore variety of strawberry. The present Cuthbert raspberry does not seem to hold its flavor after freezing as it used to ten years ago.

The mediocrity of frozen green beans can be traced to the substitution of bush varieties for the good old Kentucky Wonders.

Some day, some concern with vision (and money, as you so correctly pointed out) will start out afresh and do the job right. It will be a tremendous task, for it requires a complete break with present tradition. It requires efficient, sanitary plants located in the best agricultural sections. It should pay higher prices for frozen raw materials and demand the proper maturities. In some cases, it may be necessary to own farms outright or else subsidize the growing of the optimum varieties. Furthermore, raw materials after inspection on the receiving platform will pass through the various processing operations without being touched by human hands (except for a minimum of picking table labor) until deposited in corrugated containers in the zero storage room.

This letter has run into considerable length but I trust that it will serve to add a few amendments to your recent editorial.—*Stuart P. MacDonald, Arlington, Mass.*

Amen!

To the Editor,
FOOD INDUSTRIES:

I have just read your editorial, "Brutal Facts About Freezing." All I can say is "Amen!"

I think this is the sort of information our Foundation members should have. May we reproduce it?

Your May, 1946, issue was outstanding for frozen foods.

Again our congratulations and thanks for a most interesting and worth-while issue.—*George Loft, Economist, Frozen Food Foundation, Inc., Syracuse, N. Y.*

George Coble Increases Dairy Business from 11 to 36,000 Daily Gallons in 11½ Years — Uses 46 Frick Refrigerating Machines, Totaling Over 2,000 Horsepower

That summarizes the remarkable growth of Coble Dairy Products, Inc., of Lexington, N. C., which now has 15 branch plants.

Starting with one small Frick compressor in 1934, Mr. Coble now uses Frick Refrigeration in all his dairies—will own 51 Frick machines when those on order are shipped. Installation by Piedmont Engineering Corp., Frick Distributors at Charlotte, N. C.

Another proof of the saying that "The users of Frick Refrigerating, Ice-making and Air Conditioning Equipment make money."

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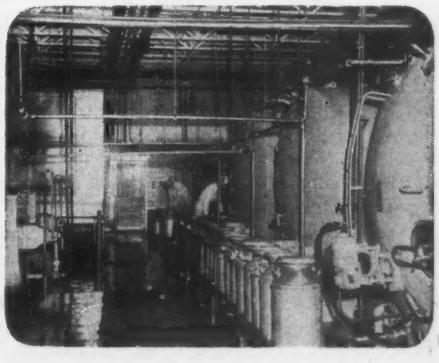
View in the Lexington, N. C., Plant of Coble Dairy Products, which Covers a City Block



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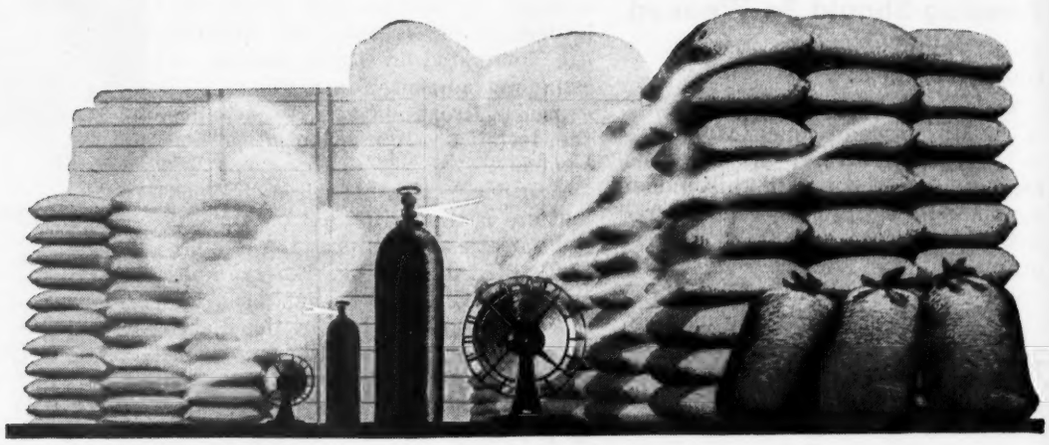

A few scattered electric fans, run for about thirty minutes, circulate the heavier-than-air Methyl Bromide and prevent stratification near the floor which would result in a poor kill higher up.

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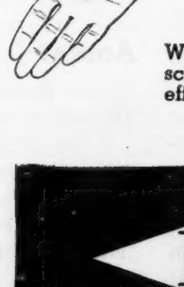
Methyl Bromide

The penetrating fumigant



To prevent early reinfestation, the fumigant *must penetrate* into every hiding place, every bit of material in which insects may seek shelter. There must be no survivors—it's all or nothing if early reinfestation is to be prevented.

It is because of its unmatched power of penetration that Dow Methyl Bromide has built up an outstanding record and reputation. Actual tests prove Methyl Bromide even reaches the centers of 140-pound flour bags stacked in large piles. Because of this penetrating power, it works quickly—fumigations are often completed over night, eliminating costly shutdowns.

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CEREALS

Soybeans Cooked in Presence of Acidic Material With pH Not to Exceed 6 Preparatory to Canning—Arthur A. Levinson and Bernard T. Malter, Chicago, Ill., and Percy L. Julian, Maywood, Ill., to Gilden Co., Cleveland, Ohio. No. 2,400,123, May 14, 1946.

DAIRY

Milk and Milk Products Freed From Foreign Odors and Objectionable Flavors by Treatment With Diketone, Agitation, and Subsequent Volatilization of Diketone—Niels P. Christensen, University City, Mo., and Roland E. Sturhahn, Webster Groves, Mo. No. 2,400,454. May 14, 1946.

Natural Fat-Containing Cheese Finely Shredded and Dehydrated in Two-Step Method to Avoid Fat Separation—George P. Sanders, Arlington, Va., to people of U. S. A. No. 2,401,320. June 4, 1946.

DEHYDRATION

Fruits, Vegetables and Their Juices Mixed With Protein Preparatory to Spray-Drying to Give Products Containing Not Less Than 25 Percent Protein Solids—Joseph M. Hall, Chicago, Ill., to Drying & Concentrating Co. No. 2,400,460. May 14, 1946.

Liquid Foods Dehydrated by Spray-Drying in Closed Recycling Circuit—Joseph M. Hall, Chicago, Ill., to Drying & Concentrating Co. Nos. 2,400,458 and 2,400,459. May 4, 1946.

ENGINEERING

Bottles Crowned With Plastic Caps Preheated to Make Skirts of Cap Moldable—Harold E. Rue, Wauwatosa, Wis., to Pabst Brewing Co., Milwaukee, Wis. No. 2,401,511. June 4, 1946.

Cracked Nuts Picked Free of Meats By Mechanical Means — Vincent L. Rodriguez, Sr., Los Angeles, Calif., Vincent L. Rodriguez, Jr., Maywood and Rudolph R. Rodriguez, Los Angeles, Calif. No. 2,401,437. June 4, 1946.

Food Products Preserved by Pre-cooking in Pressure Cookers, Filling Into Transparent Impervious Containers, Hermetically Sealing Under Vacuum, Quickly Cooling and Subjecting to Ultra-Violet Light of Wave Lengths Ranging Between 2,000 and 2,950 Angstrom Units—Duryea Bensel, to Bensel-Brice Corp., Los Angeles, Calif. No. 2,401,131. May 28, 1946.

Liquid Food Sterilized by Forcing Through Nozzle Under 2,500 lb. Per Sq. In. to Form Fine Atomized Mist Into Zone Maintained Under Pressure of 100 lb. Per Sq. In. and Containing Steam at Temperature and Pressure Sufficient to Maintain Sterilizing Conditions—Edward C. Johnston, to Robert A. Johnston Co., Milwaukee, Wis. No. 2,401,077. May 28, 1946.

FATS AND OILS

Castor Oil Refined by Distillation—Adam J. Paluszek, Port Chester, N. Y., 15 percent to James H. Hayes, Green Farms, Conn. No. 2,401,369. June 4, 1946.

Fat-Frying Mix Made to Consist of Flour, Shortening in Substantial Quantities, Leavening Agent, Sucrose and Finely Divided, Non-Crystalline, Starch Conversion Sirup Solids—Robert L. Lloyd, Laurelton, N. Y., and Ben F. Buchanan, Leonia, N. J., to American Maize Products Co. No. 2,401,259. May 28, 1946.

Vegetable, Animal and Fish Oils, Fats and Waxes Protected Against Rancidity by Addition of Beta Mercaptopropionic Compound—Myers F. Gribbins and Frederick W. Miller, Jr., Wilmington, Del., and Daniel K. O'Leary, Kennett Square, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,397,960. April 9, 1946.

FERMENTATION

Citric Acid and Salts Produced by Fermenting Carbohydrate Substrate Containing Inorganic Nutrients and Nitrogenous Material With Surface Aerobic Growth of Aspergillus Wentii in Presence of Iron and Zinc Salts—Selman A. Waksman, Highland Park, N. J. to Merck & Co., Rahway, N. J. No. 2,400,143. May 14, 1946.

FRUITS AND VEGETABLES

Apple Juice Clarified by Heat-Treating in the Presence of Lime and Acidifying Gas Such as CO_2 and SO_2—Ray M. Laird, Rootstown, Ohio. No. 2,401,169. May 28, 1946.

Citrus Fruit Material Treated For Recovery of Crystalline Hesperidin—Ralph H. Higby, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,400,693. May 21, 1946.

VITAMINS

Fat Soluble Vitamin Concentrate Obtained From Fatty Vitamin-Containing Materials by Saponifying to Produce Soap and Extracting Soap Mass With Solvent at From About 40 Deg. C. to Just Below the Boiling Point of Solvent—Loran O. Buxton, Newark, N. J., to National Oil Products Co., Harrison, N. J. No. 2,400,101. May 14, 1946.

Riboflavin Obtained by Growing Eremotheclum ashbyii on Medium Containing Animal Protein, Carbohydrates and Malt Extract With Aeration—Henry D. Piersma, Kalamazoo, Mich., to Lederle Laboratories, Inc., New York, N. Y. No. 2,400,710. May 21, 1946.

Stable Fat-Soluble Vitamin-Containing Products Made in Dry Form—Loran O. Buxton, Newark, N. J., and Harry J. Konen, East Orange, N. J., to National Oil Products Co., Harrison, N. J. No. 2,401,293. June 4, 1946.

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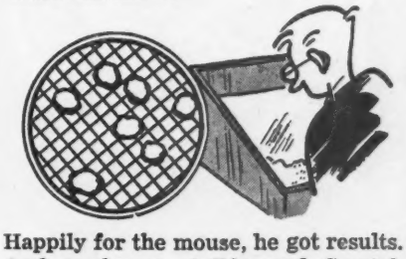

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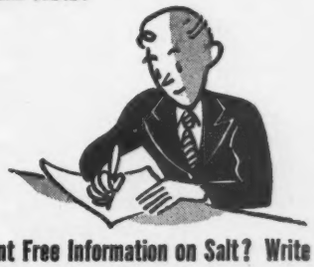

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Mr. Baker

(*Continued from page* 73)

and *Chemical Abstracts* will prove useful. In addition to these two journals, there should also be included such publications as FOOD INDUSTRIES, *Manufacturing Confectioner*, and *Food Research*. Nor should the bakery technologist scorn regular reading of the home economics section of such magazines as *Ladies Home Journal, Good Housekeeping*, and the like, for there is a great deal to be learned from their pages of how the baker's greatest competitor, the housewife, likes things done.

Regarding the personnel required to staff a laboratory, a technologist to head the laboratory and one assistant are a good combination with which to start. This team may serve the small plant very adequately for quite a while. If plant expansion takes place later, or the amount of work increases greatly, then more assistants can be given to the technologist.

So much for the general set-up of the laboratory in the medium size bakery and for the type of problems with which it can profitably concern itself. What can be said of the technologist upon whose shoulders rests the responsibility of proving to his employer that a technologist really is an integral part of the baking business today? What sort of person should this technologist be, and what are some of the attributes he should have or cultivate?

The chemist in the small- or medium-size plant has to be a little of everything, in one sense, if he is to get along successfully. For the baking plant, it will probably be better if the technologist is not the pure research scientist-type person, important and valuable as such an individual is to society and other industries. The bakery technologist should be something of an inquiring experimenter, with a strong dash of salesman in his makeup. He should have a good and solid background of science and engineering; he should be able to speak in the language and understand the quirks of the bakers among whom much of his work will be done. Moreover, since it is likely that he will seldom have the completely quiet, detached, unpressured atmosphere of the researcher in which to function, it is important that he be able to work productively without such an atmosphere. But the good bakery technologist will have this quality in common with the top-flight researcher—and that is the ability, or wit, to formulate as questions the possibilities that lie beneath the obvious facts of problems. He must be able to list the right variables for investigation. Then, too, he must have a strongly positive distaste for spending time in collecting useless information, interesting as the information may be.

Should Know Costs

His training has been along scientific lines, but he must not be content to let that be the full extent of his knowledge. The technologist must acquire familiarity with business and the business problems that affect his employer. He must know raw material costs just as thoroughly as he knows the Periodic Table—or maybe a little better. The same goes for production costs, labor and equipment costs, and so forth. Though he is a technologist, the language of the business men who hired him is chiefly one of costs, and he should be able to speak and understand that language well.

The baker contemplating the addition of a technologist to his staff ought to ask himself if he really knows why he wants such a man on the payroll. It is true that this article is an attempt to answer that question, but, nevertheless, conviction has to come from within if it is to be lastingly effective. Is the technologist being hired the way you might sit down to a Bingo game, with the expectation that this is Mr. Baker's night to hit the jackpot? Or is there some understanding on the part of top management as to why or how the technologist will fit into the team?

The old adage for having a happy home life with your wife was to "catch 'em young, treat 'em rough, and tell 'em nothing." There is a slight tendency in this same direction where the bakery is employing a technologist for the first time. As a matter of record, the policy never paid off with the women, and it is even less likely to yield results with technical men.

It has been said many times that the big companies like General Foods and Du Pont, for example, know how to make technology pay dividends, but that frequently the smaller outfits get little but disappointment even though they buy all the shiny laboratory gadgets that the big fellows do. The difference, of course, is that the big companies have spent a lot of time and high octane brain power figuring out just what they want the technologists to do. For the smaller organizations, too, whenever there has been time devoted to an understanding of what is wanted, it will be found that technologists have

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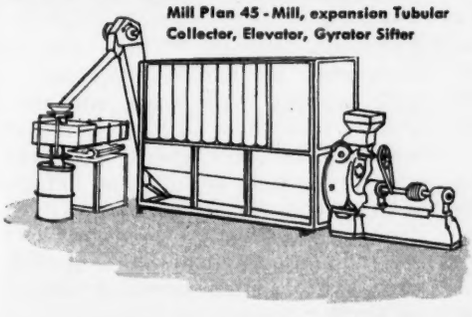

Mill Plan 45 - Mill, expansion Tubular Collector, Elevator, Gyrator Sifter

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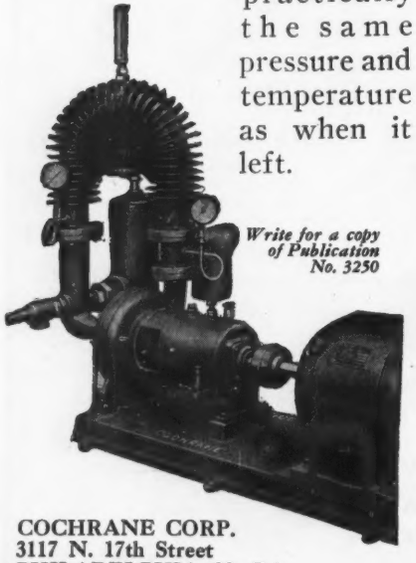

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generally made handsome dividends for the companies concerned.

The technologist must be part of the plant, not just something tacked on as an afterthought. The measure of respect paid him by the Boss sets the pace at the beginning—and beginnings are important. Top management should see to it, particularly if there has never been a technologist in the organization before, that there is an understanding all around of the technologist's responsibilities and authority, as they have been established.

Mutual Confidence

It will be an excellent thing to bring the technologist into the confidence of management as quickly as possible. There should be mutual discussions of the weak and the strong points of the company's products. The technologist should find time to ride around with the route supervisors occasionally, to find out at first hand what are the main complaints concerning the company's products, and what are the strong points of competitors' goods.

Approached from this angle, the technologist is certain to prove himself a valuable, and necessary, member of the bakery organization. The race to hold on to markets in the postwar period promises to be hard-riding and close, and in such a race no bets should be overlooked. So why not a technologist, Mr. Baker?

—End—

Storing Potatoes

(*Continued from page* 79)

sirable level in a comparatively short time.

During the first two or three months most lots will be sufficiently low in reducing sugars with the possible exception of immature or chilled lots. All lots dug more than one month should be tested for reducing sugars. If satisfactory, the potatoes can be used at once or held at about 50 deg. F. until used. If above 3.0 percent, reject if possible or condition at 70 deg. F.

Potatoes in storage three months or longer will be unsafe to use unless tested for reducing sugars. Every effort should be made to buy low-sugar varieties. Lots that have been chilled in transit or in storage should be avoided. Most experienced potato men can tell whether or not a given lot has been chilled. There may be some "leakers" or some of the potatoes may show mahogany browning. Lots showing internal discoloration, even if only to a slight extent, should be avoided. All lots should be tested for reducing sugars. If a lot is satisfactory, it should be used immediately or held at 50 deg. F. or above until used. If the reducing sugar content is above 3.0 percent the lot should be rejected or conditioned at 70 deg. F.

Conditioning Potatoes

Temperatures to use: A temperature of about 70 deg. F. appears to be best for desugaring potatoes. At 50 deg. F. little change occurs, and at 60 deg. F. reducing sugar disappears at a slow rate. It is much faster at 70 deg. F. It has been found that most lots can be satisfactorily desugared at 70 deg. F. in three weeks or less. The process takes place only slightly more rapidly at still higher temperatures but any advantage so gained is offset by danger of damage to the potatoes. Blackheart is apt to occur at elevated temperatures, shriveling will be worse, and some varieties will develop a pronounced yellow color. A range from 70 to 75 deg. F. is satisfactory, especially if there is forced ventilation.

How to condition: Potatoes stored in large quantities warm up very slowly unless forced circulation of air is provided for. Storage houses or cellars equipped with floor flumes or slatted floors can easily be converted into conditioning bins. Warehouses or other space not so provided should be equipped with slatted floors or other means of permitting forced circulation of air through the mass of potatoes. A satisfactory way to warm the potatoes is to force warm air (70 to 75 deg. F.) through the floor flumes or under a slatted floor and allow it to drift up through the potatoes. The incoming air temperature should be thermostatically controlled. Temperature readings taken in different parts of the loaded bin will locate dead spots that do not warm up properly. These can be eliminated by baffles. Potatoes in bulk storage will warm up more quickly than those in bags. As storage facilities vary greatly from one area to another, specific and definite instructions are not given. Any one desiring information to fit his own case should consult his state agricultural station, state extension service, or similar agency.

Time required: Three weeks are sufficient for most lots and some will require less. The exact time required depends upon the initial amount of sugar present, the variety, and the age of the potato. This makes it difficult to give general recommendations in respect to the amount of

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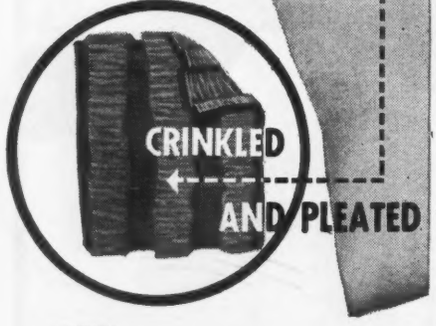

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time required. The following suggestions are made to provide a guide only, until practical experience provides better rules to follow.

Reducing sugar Percent of dry weight	Days required for conditioning at 70° F.
3-4	3-7
4-5	7-14
5-7.5	14-21
Above 7.5	21-28

During the initial runs, tests for reducing sugars should be made at regular intervals. With later runs, one can probably judge the amount of time required, thus eliminating all but one or two tests on each lot. A short period, perhaps a week, will be required to bring the potatoes up to the desired temperatures. Taking representative samples for analysis without moving the whole bin is difficult. If the above recommendations are followed in respect to air circulation, the potatoes in the top of the bin will be the last to warm up. Samples taken from the top should, therefore, be higher in reducing sugars than the average for the bin. Excessive sprouting should be avoided.

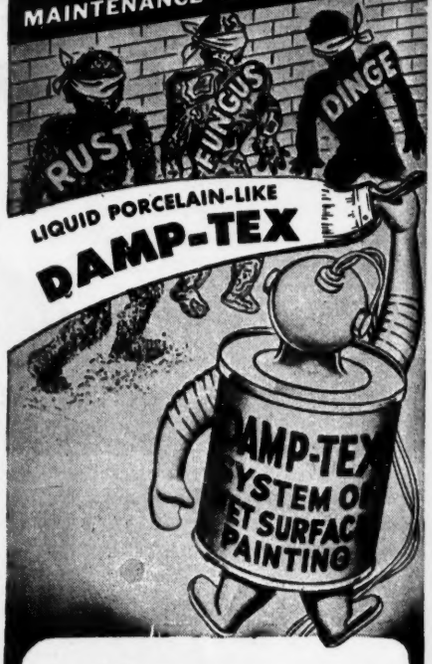
Sampling potatoes stored in bulk: There is no satisfactory method for obtaining a representative sample of potatoes stored in bulk without moving the whole bin. As a bin is emptied, or filled, sampling can be accomplished by picking single tubers at random from the elevator, grader or containers. A tuber should be taken at regular intervals so that each 400 to 500 lb. will be represented. Each composite sample should represent approximately one carload. Each composite sample should be subdivided as described above.

Preparation of sample: Wash and dry each 15 tuber samples. Remove a longitudinal quarter (long cut from stem end to bud end) from each tuber. Reject those with internal discoloration. Grind through meat grinder into large squares of muslin or gauze bag placed over a pan or beaker. Squeeze out the juice. Centrifuge, or let stand 5 to 10 minutes (but no longer) to settle starch. Long standing may result in enzymatic changes. Dilute the juice 1 to 4 with water (example: pipette 25 c.c. into a 100 c.c. volumetric flask and dilute to volume with water, or add 5 c.c. of juice to 15 c.c. of water, both measured accurately). Mix well after dilution and test immediately.

Sugar Analysis Without Colorimeter

Reagents: 1. Picric acid solution: Two grams of pure dry picric acid per liter. 2. Five percent sodium hydroxide. 3. Fifty percent acetone: Prepared fresh each day by diluting

KILLS PLANT MAINTENANCE ENEMIES



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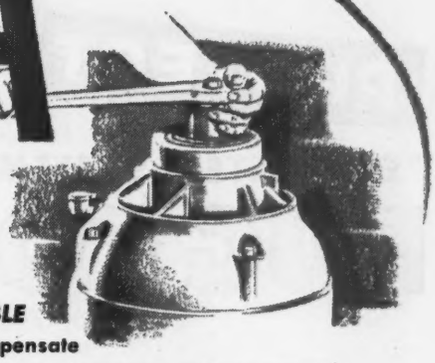
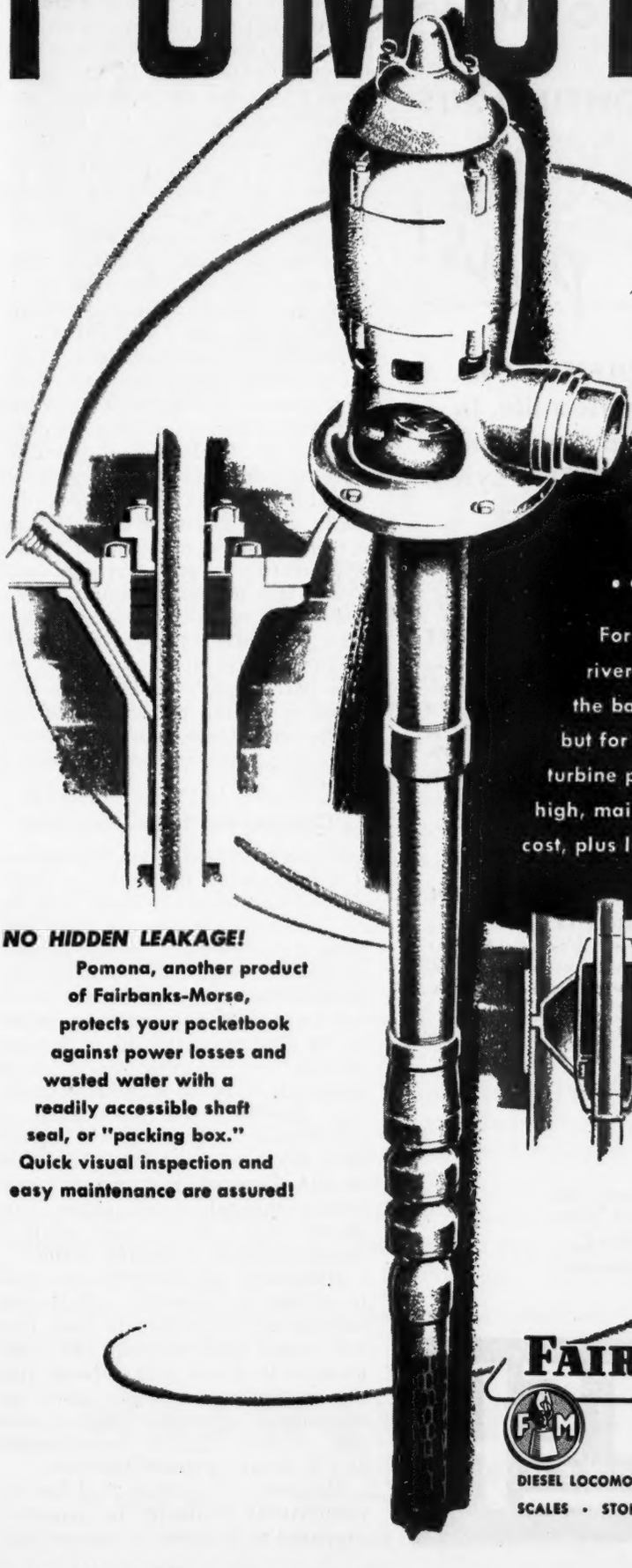
POMONA



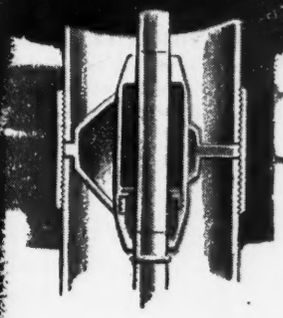
ADJUSTABLE You can compensate your Pomona pump for wear—restore proper running clearance when at last it's necessary—by one simple "topside" adjustment. No need to pull the pump to eliminate recirculation; no high adjustment costs—and valuable pumping time is saved!

Where there's a well ...here's the way!

For pumping water from wells, pits, sumps, lakes, rivers, etc., here's the way to cut costs per gallon to the barest minimum—not only in the first year, but for many, many years to come! Pomona vertical turbine pumps have the combination you're after—high, maintained efficiency for continued low power cost, plus lowest yearly maintenance expense!



NO HIDDEN LEAKAGE! Pomona, another product of Fairbanks-Morse, protects your pocketbook against power losses and wasted water with a readily accessible shaft seal, or "packing box." Quick visual inspection and easy maintenance are assured!



WHAT DO YOU NEED? The patented Pomona revolvable, water-lubricated rubber bearing with double (inside and out) bearing surfaces means quiet vibration-free shaft support under all conditions. Fairbanks-Morse vertical turbine pumps are built in sizes from 4" to 36"—with oil or water-lubrication—semi-open or enclosed impellers. Call your nearest Fairbanks-Morse office or your Pomona dealer for information on the pump best fitted to your job.

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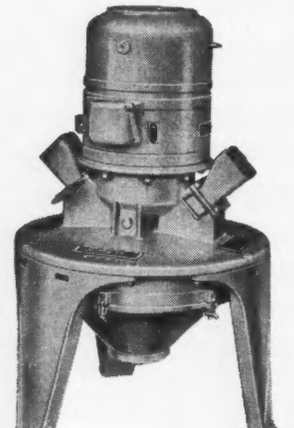
"ENTOLETER" SYSTEM GIVES CONTINUOUS

BUG CONTROL plus!

Operating records prove that "ENTOLETER" Continuous Control destroys all forms of insect life. In addition to this service, mills and food plants are reaping other benefits from the "ENTOLETER" system. Here are three positive advantages.



1 KILLS ALL INSECT LIFE

Now, more than ever, your plant and products need the "ENTOLETER" system of continuous insect control. It helps you to avoid waste of scarce food materials . . . to protect 80% flour . . . to insure the high standards of your products.

2 ESSENTIAL IN FRAGMENT CONTROL

The "ENTOLETER" system is being used successfully to reduce fragment count. Send for copy of our latest bulletin describing methods of application.

3 AIDS PRODUCT UNIFORMITY

Food plants and flour mills have found that the "ENTOLETER" system offers an excellent means of blending flours, mixing ingredients in compounds and improving vitamin distribution. This, alone, more than justifies its cost.

For full information on "ENTOLETER" Continuous Insect Control System, write to ENTOLETER DIVISION, The Safety Car Heating and Lighting Co., Inc., P. O. Box 904, New Haven 4, Connecticut.

ENTOLETER

INFESTATION DESTROYER

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acetone with an equal volume of water.

Procedure: Pipette 1 c.c. of the diluted juice into a test tube graduated at 25 c.c. Add 3 c.c. of the picric acid solution and 0.5 c.c. of 5 percent NaOH. Add next 5 drops of 50 percent acetone and place tube promptly in boiling water bath. In 12 minutes remove the tube, cool, and dilute contents to 25 c.c. Mix the contents, then compare with the permanent standards in tubes of the same dimensions and estimate the amount of sugar. The permanent standards are made as described below.

Permanent sugar standards: Prepare the following solutions: (1) C. P. Ferric chloride: dissolve 200 gm. of ferric chloride ($FeCl_3.6H_2O$) in about 300 c.c. distilled water, transfer to 500 c.c. volumetric flask, make up to volume with distilled water and mix well. Filter through a dry filter paper. (2) C. P. Cobalt chloride: dissolve 150 gm. cobalt chloride ($CoCl_2.H_2O$) in about 300 c.c. distilled water, transfer to a 500 c.c. volumetric flask, make up to volume with distilled water and mix well. Filter through a dry filter paper. (3) Dilute hydrochloric acid: dilute 5 c.c. concentrated hydrochloric acid to 50 c.c. with distilled water. (4) The permanent standards are prepared by mixing the above solutions in the proportions indicated in Table III. 100 c.c. volumetric flasks should be used.

Colorimetric Sugar Analysis

Greater accuracy can be obtained if a colorimeter, preferably a photoelectric colorimeter is used. The picric acid method does not work well with a colorimeter, hence another method is suggested. Sampling and preparation of sample are carried out as described previously, except in the dilution of the juice. It is essential, however, that the juice be absolutely free of suspended material, therefore the juice must be centrifuged. Filtering will accomplish the same thing but it is not desirable because raw potato juice passes through filter paper very slowly. Long delays may result in changes due to enzymatic action.

Dilution of juice: Unless the juice is diluted considerably before use, extraneous compounds in raw juice will cause false values. The exact amount to dilute will depend upon the particular colorimeter used and the amount of reducing sugars present. Lowest dilution recommended is 4 to 50 and highest 1 to 100.

Reagent: If sodium 2, 4-dinitrophenolate is available, the reagent is prepared as follows:

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WALWORTH Bronze Valves

Walworth No. 95 can be used where throttling *is not* required. It is rated at 150 lbs. steam pressure at 500°F, and its improved renewable disc and lock-on, slip-off disc holder — an original Walworth development — saves time and trouble.

Walworth No. 225P is rated at 300 lbs. steam pressure at 550°F. With stainless steel, plug type discs — heat treated to a hardness of 500 Brinell — it can be closed on sand, slag, scale and similar flotage, without injuring the seating surfaces.

Walworth No. 29 is a double disc taper seat gate valve with a rising stem and union bonnet. It is rated at 200 lbs. steam pressure at 550°F. Valves can be repacked under pressure when fully opened.

These Walworth Quality Bronze Valves provide maximum protection against leakage by their union bonnet type construction, seats and discs of proper design, deep stuffing boxes, and tough bronze bodies. Further, they can be repacked under pressure when fully opened. Walworth Quality Bronze Valves are available in a full range of types and sizes, engineered to fit every service requirement.

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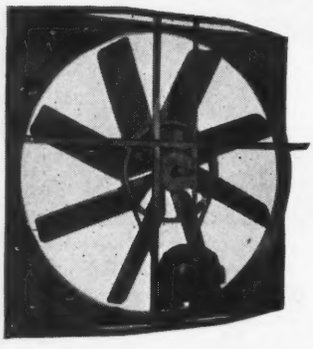

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The Coolair Type O fan shown here can be installed in side walls, window openings or on the roof, in single or multiple-unit installations, to effectively cool any building.

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AMERICAN COOLAIR CORPORATION

"Pioneer Manufacturers of V-Belt Drive Exhaust Fans"

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Solution A: Dissolve 8 gm. sodium 2, 4-dinitrophenolate and 2.5 gm. phenol in 200 c.c. of 5 percent sodium hydroxide.

Solution B: Dissolve 100 gm. Rochelle Salt (sodium potassium tartrate) in about 500 c.c. of distilled water.

Mix solutions A and B together, then transfer to a 1,000 c.c. volumetric flask and make up to volume with distilled water. The water required to make the desired volume should be used to rinse out the containers in which A and B were prepared.

If sodium dinitrophenolate is not available, proceed as follows:

Solution A: Dissolve 7.145 gm. 2, 4-dinitrophenol in 230 c.c. of 5 percent sodium hydroxide. Heat on steam bath, or hot water bath, until the 2, 4-dinitrophenol dissolves. Then add 2.5 gm. phenol. Heat some more if the solution does not remain clear.

Solution B: Dissolve 100 gm. Rochelle Salt in about 500 c.c. of distilled water.

Mix the two solutions and make up to 1,000 c.c. as described above.

Procedure: Pipette 2 c.c. of the diluted juice into a 40 to 50 c.c. test tube. Add 6 c.c. of the dinitrophenol reagent. Mix, then heat on a boiling water bath for exactly 6 minutes. Cool 3 minutes in running water. Transfer a portion to a colorimeter tube and immediately estimate the amount of reducing sugars present. The tubes should not be removed from the cold water until just before readings are made. All necessary adjustments of the colorimeter should be made before the tubes are taken from the cold water. The color is stable for 20 minutes when the tubes are kept cold. Use a filter with maximum absorption at approximately 600 millimicrons.

Standard sugar solutions: With any photoelectric colorimeter, it will be necessary to prepare a calibration curve, using standards prepared from anhydrous glucose. The particular concentrations to use will depend upon the kind of colorimeter available. A stock glucose standard can be made by dissolving 1 gm. of anhydrous glucose in distilled water and making the volume up to 100 c.c. This will give a glucose solution containing 10 mg. per c.c. and may be diluted to any desired extent. Glucose standards will keep for long periods in the refrigerator provided a crystal of thymol is kept in each. In preparing the calibration curve, the sugar standards are treated exactly as are the juice samples. The calibration curve should be checked occasionally.

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The unique moisture-proof quality of Sylvania Cellophane keeps moisture in or out . . . seals in all the flavor of the fresh product. Water-resistant, dust, air and grease proof, too! It's the preferred wrap for every kind of baked goods. Sylvania Cellophane can be beautifully printed in as many colors as desired to achieve effects unobtainable on other materials.

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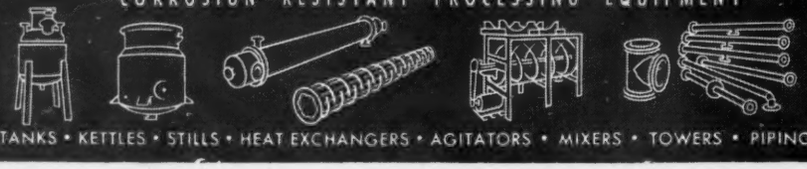
CORROSION RESISTANT PROCESSING EQUIPMENT



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Calculations: Analyses of the potato juice are conveniently expressed as milligrams per c.c. This can be converted to percent of the dry weight by multiplying by the factor $\frac{M}{10S}$ where M is the percent moisture in the raw potato and S is the percent of total solids. The following will serve as an example:

Total solids ..... 18 percent
Moisture ..... 82 percent
Dilution of juice..... 2 to 50
Reducing sugar in diluted juice:
0.208 mg. per c.c.
Reducing sugar in original juice:

$$0.208 \times \frac{50}{2} \text{ or } 5.2 \text{ mg. per c.c.}$$

Reduucing sugar in raw potato:

$$5.2 \times \frac{80}{10 \times 18} \text{ or } 2.37 \text{ percent}$$

The final result, 2.37 percent, is the reducing sugar content of the raw potatoes, based on dry weight.

—End—

Meat in Germany

(*Continued from page* 85)

around 8 percent. More than this was lost during subsequent dry-curing and smoking.

3. The salt content of both ham and bacon was found to be low. Hams and bacon for domestic trade seldom carried more than 2 percent salt content.

Canned Hams—Whole hams were canned to a major extent until the end of 1943, when the practice was discontinued because of the shortage of pork. American packers are familiar with the so-called "Polish style" hams imported into this country prior to the war. The German-canned Westphalian ham was somewhat similar to the Polish product. It was arterial pumped to a salt content of approximately 1.75 to 2.0 percent. After several days in dry-cure, the ham was partially boned and smoked. Only a light smoking was given; 10 to 12 hours at 75 deg. F. The ham was then pressed in a ham-forming machine to obtain a proper shape. It was placed in a large oval-shaped pan and then evacuated and processed. An extremely light processing was given. The ham was cooked in open kettle at a temperature of 85 to 90 deg. C. Siekmann of Westphalia cooked a 12-lb. ham for 4 hours only at a temperature of 85 deg. C. This represents a rather dangerous practice, if judged by American standards, because it is impossible to secure a steril meat product under such conditions of time and temperature. Siekmann nevertheless claimed to have shipped hams throughout the entire world without regard for refrigeration. He scoffed at our ideas that his hams would not keep. All other processors of Ger-

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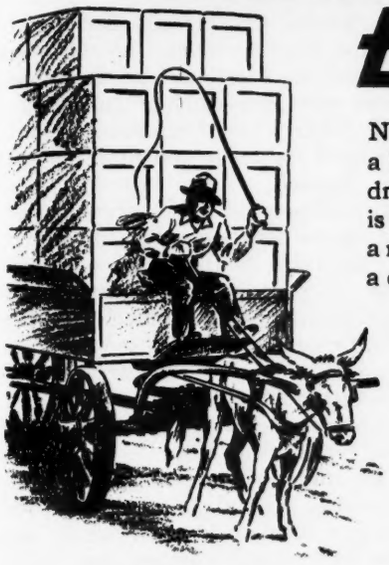

No one would expect a burro to pull a load that requires a heavyweight draft horse. But a sure-footed burro is just right for carrying a pack on a mountain trail where the power of a draft horse would be wasted.

And yet when it comes to valves, such "misapplication" is often encountered. *Many cases of failure are directly due to expecting service from a valve which it was not designed to give.* Consequent replacements are costly. On the other hand, it is not sound economy to use a valve of more expensive construction than the particular service requires. The Powell Line* of Bronze, Iron, Cast Steel and Corrosion Resistant Valves, is so *complete* that there's a POWELL Valve that's *just right* for every flow control condition encountered in modern industry. When you need valves for new installations or for replacements, don't risk "misapplication". Consult POWELL Engineering and *get more for your valve dollar.*

The Wm. Powell Company, Cincinnati 22, Ohio

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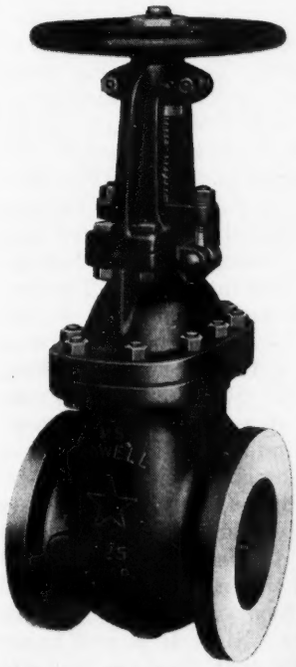
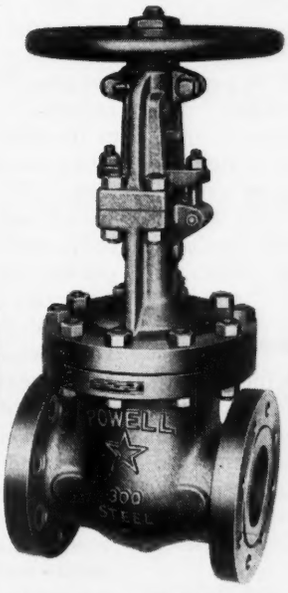
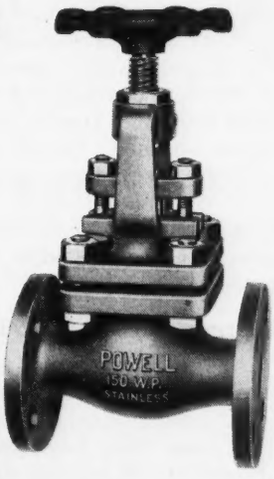
*In writing for catalogs kindly specify the service conditions under which the valves, in which you are interested, must operate.



Large Iron Body Bronze Mounted Gate Valve for 125 pounds W. S. P. Made in sizes 2" to 30", incl. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Taper wedge double discs can be provided in sizes 2" to 12", incl. Seat rings and stem are bronze. Disc is bronze in 3½" and smaller size valves and bronze faced in the larger sizes. Also available in All Iron for certain services.

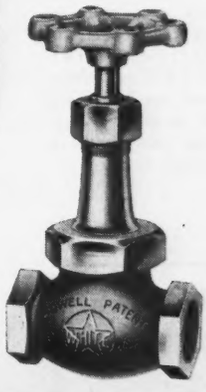


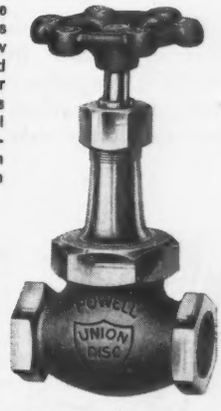
Class 300-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Powell Cast Steel Valves of all types are available in pressure classes from 150 to 2500 pounds, inclusive.



Small Bronze Globe Valve for 200 pounds W.S.P. Made in sizes ¼" to 3", incl. Has screwed ends, union bonnet, renewable, specially heat-treated stainless steel seat and regrindable, renewable, wear - resisting "Powellium" nickel-bronze disc. A long-life valve, designed to stand up under severe service conditions.

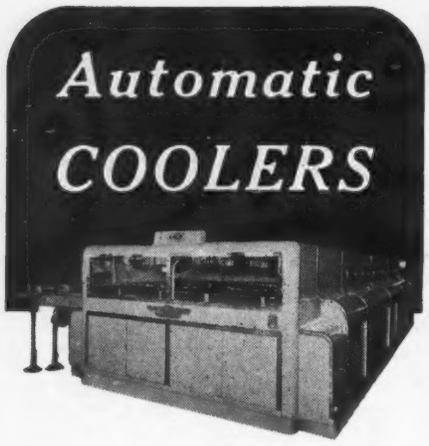
Stainless Steel Gate Valve for 150 pounds W. P. Has flanged ends, outside screw rising stem, bolted flanged yoke - bonnet and taper wedge solid disc. This is one of many special Powell designs for handling corrosive media. Available in a wide range of corrosion resistant materials.





Small Bronze Globe Valve for 150 pounds W. S. P. Made in sizes ¼" to 3", incl. Has screwed ends and union bonnet. Regularly furnished with renewable vulcanized composition disc for steam service, but special discs are available for other services.

POWELL VALVES



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VORTEX coolers are special purpose units widely adaptable to individual requirements and are furnished for almost any capacity. Among the many features of the design are the patented "walking beam" conveyor, a smooth self-lubricating hydraulic drive, and the economical atomized spray system which achieves the thermal transfer.

Here is a machine that merits your immediate investigation. The VORTEX system is entirely automatic in operation, and its maintenance calls for only routine care.

It will pay you to obtain the technical bulletins on the VORTEX cooler. Consult our representatives or write today, stating your process requirements.

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man canned hams made the same claims and on occasion would proudly present evidence covering shipments of hams to China, Africa, and elsewhere, which they claimed to have processed in the described manner. Nevertheless, the official German army-ham specifications required the addition of 0.2 percent benzoate of soda to the curing solution and also required a double-cooking method with 48 to 96 hours' incubation between cooks.

Fresh Meats for the Army

Fresh meats and fresh sausages were provided the German army by means of its own slaughtering and sausage manufacturing facilities. The meat packing industry of Germany was not called on to furnish items of this type. Insofar as possible, the German army lived off the countryside, although large shipments of livestock were shipped to the Russian front in 1943 and 1944. According to the director of meat rationing, they succeeded in restricting the use of meat products by the army to 33 percent of the total quantity available for the entire country. A study of German army specifications indicated the more complete use of the entire animal in sausages as the war progressed. Percentages of tripe, lungs, hearts, kidneys, feet and bone fat were increased in nearly every type of sausage product. It was estimated that nearly 50 percent of the meat content of a soldier's diet came from one type of sausage product or another. This is a rather important observation because certain meat components, such as fatty tissues, kidneys and stomachs could be provided to the soldier in forms attractive to him.

Army and Navy Canned Meats

A wide variety of canned meats was prepared for army and navy use. The variety was greater than that furnished the American army, although the quantities produced were insignificant by comparison. Canned meat items were classified in three categories:

1. Pure meat products
2. Sausage products
3. Mixed meat rations.

The "pure meat products" were usually of the simplest type. The most popular products consisted of plain beef or plain pork. These meats were cut into cubes of approximately 1- to 2- in. size, crammed into cans by means of a stuffing machine, seasoned with salt and pepper, sealed and canned. In some cases, 3 percent of skin was ground and added to the meat to provide an absorbent for excess juices. The German troops did not object to the cooked-out meat juice, however. The salt content was held under 2 percent in all cases. The absence of spices made these products bland and somewhat flat at first, but this very fact added to their desirability when consumed over long periods of time.

Reference has already been made to the canned hams, which were thought so delicious by American troops who succeeded in capturing a few. Nearly every sausage product produced for fresh consumption was also canned. This included liver pastes of several types, frankfurters and special link sausage. In some of the products benzoate of soda was used as a stabilizing factor. The frankfurters were canned in dilute salt brine containing sodium benzoate. The use of this preservative was forbidden, however, with the exception of a few canned meat products for African use.

An interesting meat product was known as Schmalzfleisch. This product consisted of canned whole hog. The entire pork carcass was cubed, the various cubes mixed together with 2 percent salt, stuffed into cans and processed. The resulting product consisted of approximately 50 percent lard and 50 percent chunks of lean. It resembled Russian Tushonka to some extent. This product was very popular with German troops. It probably would have been rejected by American troops because of its excessive fat content. The Germans, however, consumed it in two ways, (1) by spreading the lard on bread and eating the lean portions cold, and (2) by using it as a component for stews, gravies, fried potatoes and similar foods. It seems to me that Schmalzfleisch constituted a very sensible ration. Regardless of the excessive fat content, the product was of delicious flavor. The product packed the biggest wallop in calories and food value of any German army ration. Since it is well known scientifically that fats are desirable foods and are easily digested, it seems that our army needs to do considerable educational work not only for the purpose of popularizing a fatty canned meat product, but also to increase consumption of sausage containing high percentages of fat.

Dehydrated Meats

Dehydrated meats are known in Germany and were manufactured to a minor extent at the very end of the war. At Dachau, we encountered a packer who had an order, dated April 5, 1945, to dehydrate meat. This order was received only shortly before

GOOD ECONOMY...

Yes—there is worthwhile economy in using Foster-Forbes food jars. Although light in weight, they have a margin of strength to withstand rough bottling line treatment. In addition, high resistance to thermal shock results in greater canning efficiency, and accurately uniform finishes provide excellent closure seating.

Remember—for economy and sales appeal—choose Foster-Forbes glassware.

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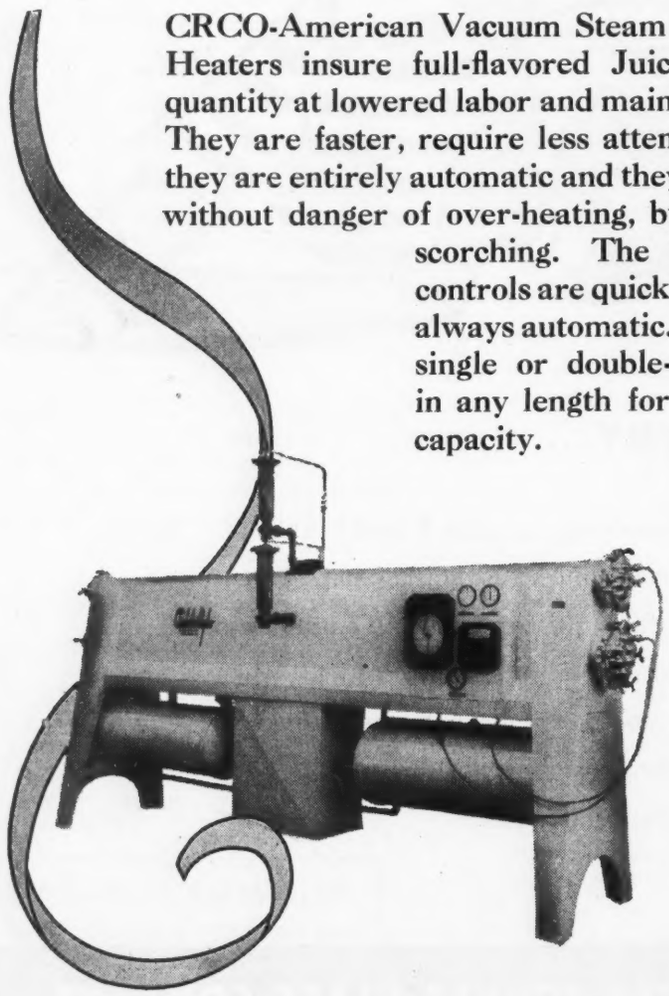
CRCO-American Vacuum Steam Design Pre-Heaters insure full-flavored Juice in greater quantity at lowered labor and maintenance cost. They are faster, require less attention because they are entirely automatic and they heat evenly without danger of over-heating, burning-on or scorching. The thermostatic controls are quick, positive and always automatic. Available in single or double-tube models in any length for any desired capacity.



WRITE FOR BULLETIN

THE BEST OF Everything

CHISHOLM-RYDER
Niagara Falls, New York
FOR · THE · FOOD · PROCESSOR ·

Dachau was captured by American troops. It was interesting to note that our air force had wiped out German transportation and that transportation advantages were given as the reason for requesting the dehydrated meat. The owner of the Dachau establishment, being a good Nazi, dehydrated the meat only two or three days before the American army arrived to take it over. I might comment that it was the poorest dehydrated meat I have ever seen.

On the other hand, dehydrated beef of extremely high quality was encountered at other German meat packing establishments. This product had been partially precooked, dried very slowly on continuous-belt tier-driers preparatory to smoking with wood smoke for 20 hours after dehydration. It reconstituted easily and was very highly prized by those who received it.

—End—

Concrete Floors

(*Continued from page* 96)

or more times and may either be mopped on or applied with a sprinkling can and then spread evenly with a mop. The floor should be allowed to dry between applications. The time required for absorption, reaction and drying is from three to four hours. Shortly after the last application, the floor should be mopped with clear water, otherwise white stains may result from encrusted salts. This treatment can be applied to non-slip floors. After fluosilicate has been applied, floors may still be varnished, waxed or painted, but where spillage of liquids or grease is frequent, these treatments are inadvisable because of the hazards of slippery floors.

Care of Concrete Floors

The proper care of concrete floors pays dividends in longer life and more satisfactory service. Dirt and spillage should be scrubbed off frequently with soap and warm water followed by a thorough flushing with clear water. Scrubbing not only keeps the floors clean but it also removes or dilutes any acid concentrations that may be forming in the surface pores of the concrete.

If cracks occur in the floor, they should be filled at once with a stiff mortar consisting of 1 part portland cement to 2 or 3 parts of sand. When floors are used by vehicles, especially those with steel tires, they should be kept smooth and free of dirt and debris to eliminate the impact caused when wheels pass over such obstructions.

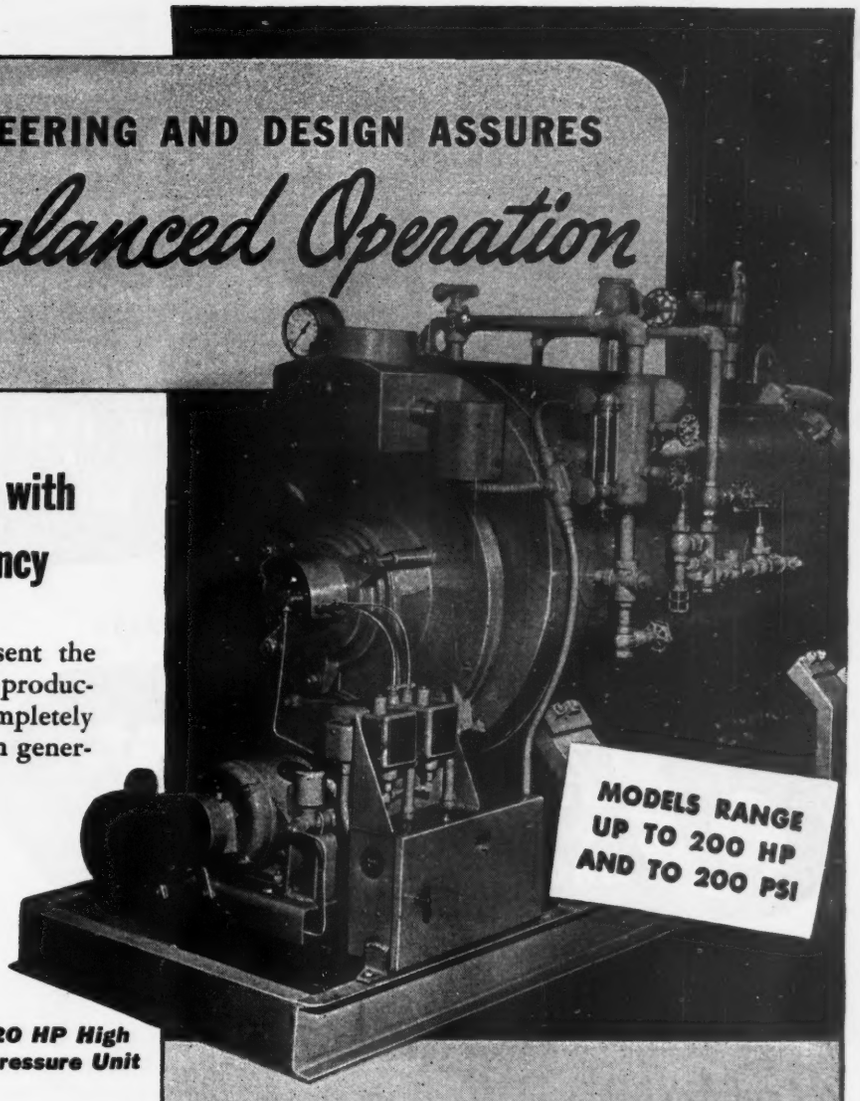
CYCLOTHERM ENGINEERING AND DESIGN ASSURES

Perfectly Balanced Operation

Combine simplified design with highest operating efficiency

Cyclotherm Steam Generators represent the most modern development in the steam production field. Each Cyclotherm unit is a completely self-contained and fully automatic steam generating plant. All components of Cyclotherm units are individually engineered or specially selected by Cyclotherm's design engineers for *perfectly balanced* operation.

Cyclotherm units are manufactured with all the simple and advantageous features of two pass boiler construction—yet perform with the highest operating efficiency. This is possible because of the exclusive Cyclotherm method of combustion and heat transfer.



20 HP High Pressure Unit

Oil or gas fired

All Cyclotherm units may be operated with either light oil or gas or equipped with combination oil-gas burners which permit the changeover from one fuel to the other by merely throwing a switch. Models from 50 HP to 200 HP may be fired with either heavy oil or gas. On these larger models firing rates are automatically modulated from 30% to 100% of rated capacity—without loss of operating efficiency.

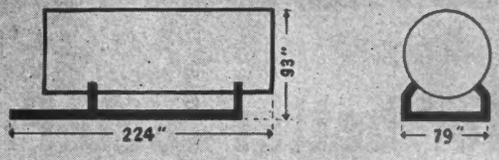
Cyclotherm units are fully equipped with automatic operating and safety controls and are completely assembled and tested at the factory.

Cyclotherm is ready to deliver steam upon arrival after connection to water, fuel and electric lines.

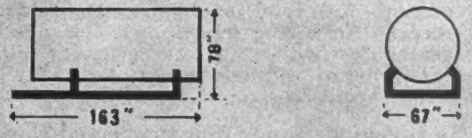
Write, wire or phone for more information.

NOTE FAVORABLE "GO THRU" DIMENSIONS
A Cyclotherm may be installed anywhere —functions without foundation or stack.

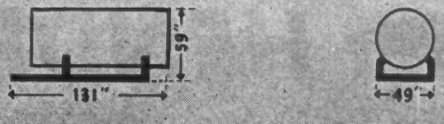
200 H. P. MODEL



100 H. P. MODEL

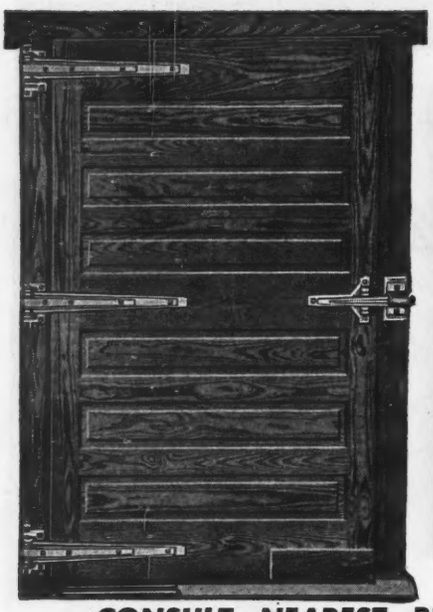


40 H. P. MODEL



CYCLOTHERM STEAM GENERATORS

CYCLOTHERM CORPORATION, 90 BROAD STREET, BOX 901, NEW YORK 4, N. Y.



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CONSULT NEAREST BRANCH OR ADDRESS

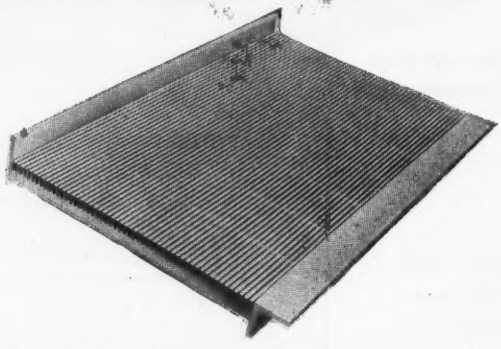
JAMISON-

BUILT COLD STORAGE DOORS

HAGERSTOWN, MARYLAND

BRANCHES IN PRINCIPAL CITIES

Better Screens



...for better food Processing

Hendrick manufactures perforated metal screens for many different food processing operations — stainless steel screens for food equipment and sizing operations — screens for sizing mushrooms — wedge slot screens for screening food wastes — screens for oil foods — screens for sizing of all kinds of nuts and many other food products. Write for complete information today.

Hendrick Wedge Slot screen and Hendrick Perforated Metal screen are available in stainless steel or monel.

HENDRICK

Manufacturing Company

49 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Amorgrids.

sorting machine include the RCA-908 cathode-ray tube, the RCA-2050 thyratron and phototubes RCA-918 and RCA-1P29. The average life of RCA electron tubes used in this installation has been estimated at more than 8,800 hours.

—End—

Palletized Shipments

(*Continued from page* 87)

either to a storage warehouse or direct to the loading dock into freight cars by fork trucks.

Postwar Conversion Problem

During the war, the armed forces had facilities for handling pallet loads. In the food industry today, most receivers are unable to handle palletized loads efficiently, if at all. Civilian industry, in considering palletizing applications, must take cost into account as well as savings in man-hours. With both armed services, saving of man-hours was the primary objective. Cost of handling was secondary. Experience has shown that saving of man-hours does not necessarily indicate saving of dollars. Unit cost of handling palletized loads was lowest with the largest shipments.

One important stumbling block in the way of postwar adoption of palletizing has been the high initial cost of pallets. In addition, the ICC and the Association of American Railroads are reluctant to consider pallets as dunnage. At the present time, the commodity rate is applied to the entire palletized load. There are, however, recent developments that will pave the way for general peacetime use, including:

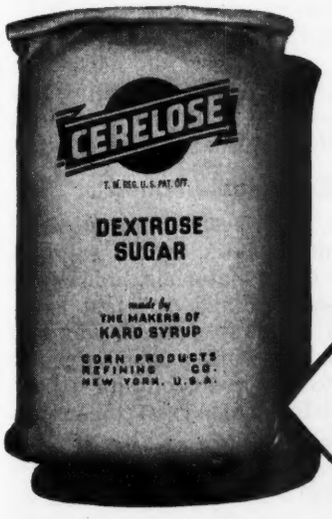
1. Formation of a pallet exchange pool.
2. Durable metal pallets, lighter than wood.
3. Low cost expendable pallets.

Pallet Exchange Pool

A pallet exchange pool is being organized by the Lawrence Warehouse Co. The exchange will be operated by the Lawrence Universal Pallet Corp. This organization has complete accounting facilities required for its nation-wide warehouse receipt business and is, therefore, in an excellent position to handle the records. Objectives of the pallet exchange are:

1. To provide a materials handling engineering service specializing in fork truck handling and unit load shipping.
2. To maintain a materials handling research laboratory. It will de-

Year after year...



Year after year extensive advertising has hammered home the facts about dextrose. Today 8 people out of 10 know what it means when the label says . . . "rich in dextrose."

CORN PRODUCTS SALES CO.
17 BATTERY PLACE NEW YORK 4, N.Y.

rich in dextrose

CERELOSE *is* **dextrose**

NUKEMITE

The Perfect Protective Coating

NUKEMITE incorporates all the qualities most desired in a protective coating for piping, floors, walls, tanks, structural work and machinery in food processing plants. It is easy to apply by spraying, brushing or dipping and dries to form an impenetrable film which is immune to food acids, cleaning compounds, salt solutions, corrosives, alkalies, most solvents and extreme weather conditions.

NUKEMITE has great resiliency and flexibility, yet it adheres tenaciously to all types of surfaces—wood, concrete and steel. It is available in attractive colors.

NUKEMITE is not a paint. It is a compound of synthetic resins and its protective life is many times that of corrosion resistant paints. NUKEMITE will improve the appearance of your plant and, at the same time, protect your equipment against all types of corrosion.

Write for your FREE copy of new booklet describing NUKEMITE'S qualities in detail. Or ask for our complete Nukemite Trial Kit—sent postpaid for $2.95.

NUKEM Products CORPORATION

108 COLGATE AVENUE, BUFFALO 20, N. Y.

sign packaging materials to fit the pallet handling system, develop new pallet handling equipment and study loading of palletized materials for rail car, truck and ship.

3. To organize into a mutual association all industrial and commercial concerns utilizing pallet shipments. Efforts will be made, through the association, to obtain a weight allowance for pallets in rail shipments and lower freight rates on truck and water shipments of palletized material.

4. To provide a pallet exchange service.* Pallets will be leased to shippers and consignees in accordance with terms of an annual standard contract, cancellable at the member's option.

A standard pallet, 40x48 in., has been developed. The size was determined by studying existing transportation equipment and not by the conventional method of making the pallet fit the particular material to be handled. Width of doors and the inside width of refrigerator cars were the limiting factors. Many cases shipped in large volume, such as No. 2, 2½ and 6/10 will fit this pallet. Weight of the pallet is about 50 lb., considerably less than conventional pallets of the same size. Empty pallets can be nested or shipped knocked down to save space. A special bolting arrangement simplifies disassembly and reassembly.

Aluminum Pallets

Aluminum pallets, manufactured by Reynolds Metals Co., Inc., Louisville, Ky., are six times the cost but only one-third the weight of wooden pallets. These light-weight metal pallets reduce freight charges on outgoing and return shipments. Based on 13 round trips per year, they are estimated to make up for the initial cost difference in two years. While light, these pallets can support loads up to 26,000 lb. Some of the advantages of aluminum pallets are: (a) They do not absorb nor impart odors, (b) dirt and grease do not affect them, (c) they are non-sparking and non-combustible, and (d) there are no splinters nor sharp edges.

Expendable Pallets

Pallets have been constructed of paper, impregnated with sulphur, plastic or other materials. Some companies have not had sufficient experience to warrant general adoption of such pallets. Other companies are anxious to try them, but have been prevented by shortage of the neces-

*Information on this pallet exchange service may be obtained from Lawrence Warehouse Co., 37 Drumm St., San Francisco, Calif.

TAKES THE WATER YOU HAVE

CATION

EXHAUSTION

$Ca(HCO_3)_2 + H_2X = CaX + 2H_2O + 2CO_2$

$MgSO_4 + H_2X = MgX + H_2SO_4$

$2\,NaCL + H_2X = Na_2X + 2HCL$

REGENERATION

$CaX + H_2SO_4 = H_2X + CaSO_4$

$Na_2X + H_2SO_4 = H_2X + Na_2SO_4$

ANION

EXHAUSTION

$2A + H_2SO_4 = A_2{\cdot}H_2SO_4$

$A + HCL = A{\cdot}HCL$

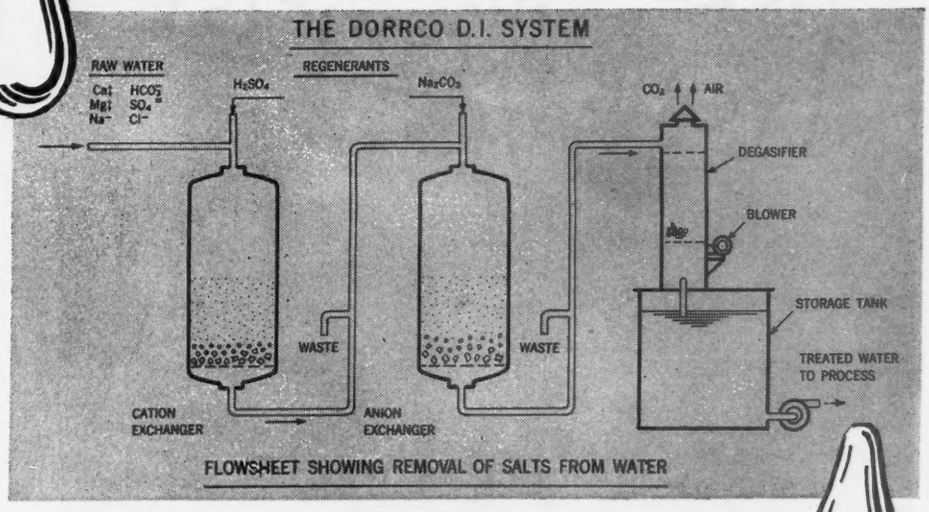
REGENERATION

$A_2{\cdot}H_2SO_4 + Na_2CO_3 = 2A + Na_2SO_4 + H_2O + CO_2$

$A{\cdot}HCL + Na_2CO_3 = A + NaCl + H_2O + CO_2$

H_2X = REGENERATED CATION

A = REGENERATED ANION



MAKES IT THE WATER YOU WANT

The equivalent of distilled water at a fraction of the cost

If you're still paying high prices for your process water, it will pay you to investigate the Dorrco De-Ionization System. It treats whatever water you have, makes it the equivalent of distilled water, for 2 to 20 cents per thousand gallons.

Operating on the principle of ion exchange, the D-I System utilizes an improved multi-stage regeneration process. This process gives you close control over water properties—gives you prescription water to meet your most exacting plant requirements. The entire system comes to you in a single, compact, self-contained unit. Write Dorr today for particulars on the D-I System.

WHAT D-I DOES

- Removes simple hardness
- Decreases Bicarbonate Alkalinity
- Reduces total solids
- Performs two-stage de-ionization with regeneration of exchangers
- Delivers capacities of 100 to 1500 gallons per hour

WHERE D-I CAN BE USED

Foods	Chemicals
Rayon	Spirits
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Metal	Pharmaceuticals
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1561

DORRCO

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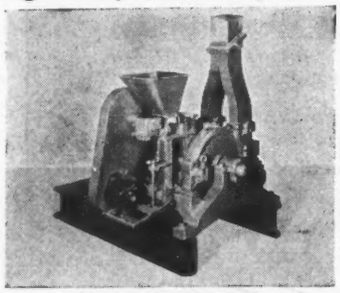
ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE

No. 5 MIKRO-ATOMIZER — a self-contained small production unit requiring very little floor space.

A smoother material obtained by grinding your product finer than you have ever pulverized it before, may mean *new* products as well as new marketing possibilities for you.

The development of the MIKRO-ATOMIZER now makes possible the ultra-fine grinding of your product down to the 1 to 25 micron range (under 325 mesh). Others have found that this super fine grinding improved their products, helped provide *new* products, and opened the way to new markets.

You can investigate all the advantages of this ultra-fine grinding right in your own plant. You can purchase a machine for small quantity production, pilot plant or laboratory work, or you can get a larger size for full-scale manufacturing schedules.



No. 6 MIKRO-ATOMIZER for large production operations.

Send for your copy of new Advance Bulletin and learn how this radically new type of pulverizer may help you improve the smoothness and texture of *your* products.

PULVERIZING MACHINERY COMPANY
97 CHATHAM ROAD • SUMMIT, N. J.
NOW . . . 2 TYPES TO MEET MOST PULVERIZING NEEDS

MIKRO-PULVERIZER (FINE)
MIKRO-ATOMIZER (ULTRA FINE)
Reg. U. S. Pat. Off.

sary raw materials. Objectives of the expendable pallet program are: (a) Reduction of pallet weight to save freight and (b) reduction of initial cost in order to obviate return of the pallet. In addition to the impregnated paper construction, pallets are being made experimentally of plastic, plywood and even of compressed waste materials.

—End—

Pack-Coding

(*Continued from page* 81)

count and lots packed should not be too large in order to reduce loss through possible seizure. High mold counts and excessive insect fragments are sometimes found in jam. Manufacturers of jam should be careful in selection of raw products and should protect themselves by coding their packs better in order to avoid seizures. Large lots of uncoded jams have been held up many times because of mold or insects where good and bad merchandise were together in the same lots.

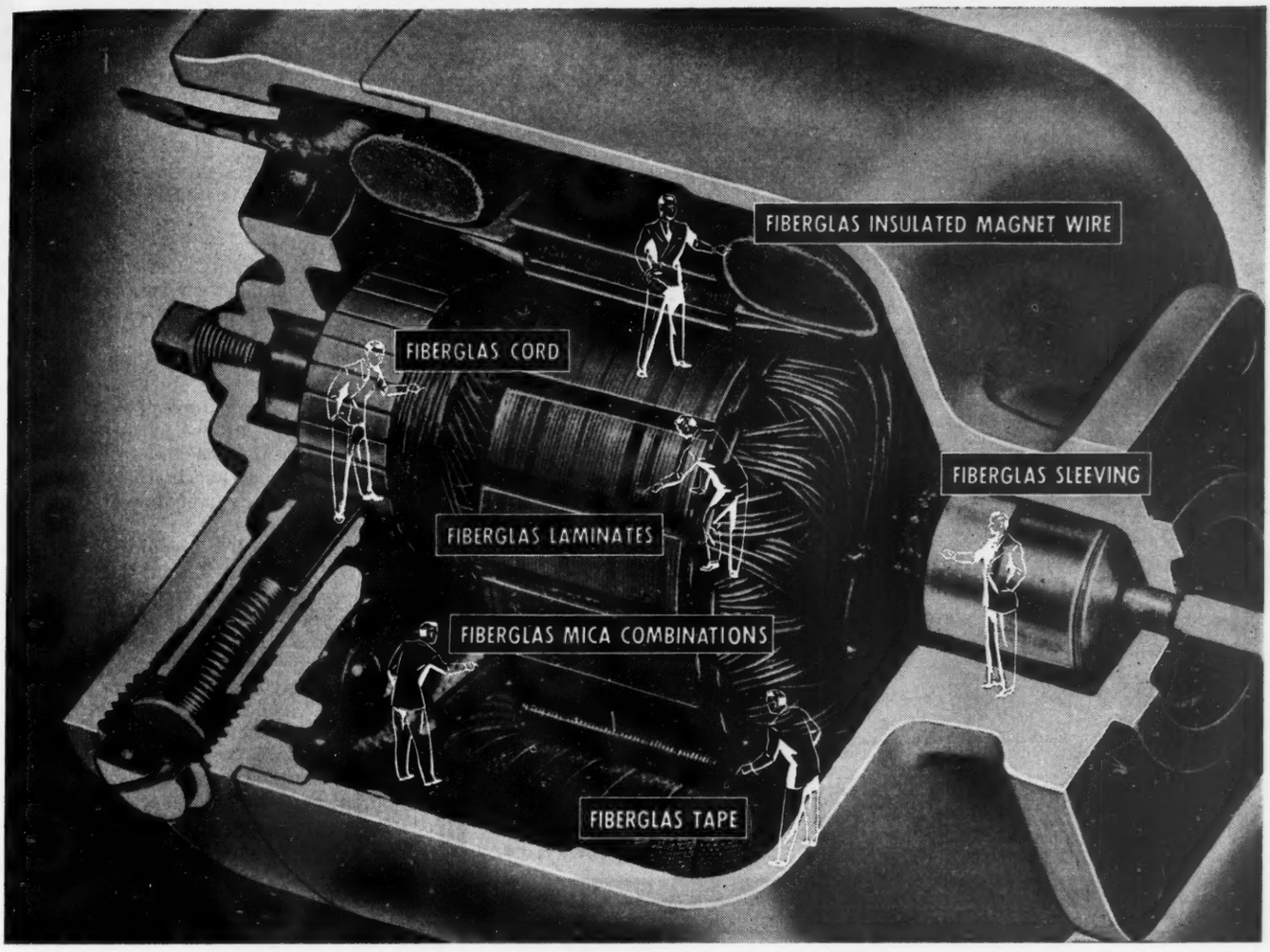
A marmalade packer asked for inspection of his product after having packed a block of some 15,000 cases of orange marmalade in glass. None of it was coded. One part of the stack evidenced badly scorched product and another part contained excessive scale insects and poor appearing peel. There was some good merchandise in this lot, but because of improper coding no segregation was possible and none of the lot was acceptable. This manufacturer suffered doubly because this lot severely depleted the already scant remains of his sugar quota.

A government agency once called for inspection of two carloads of frozen whole kernel corn which it had just received and unloaded into government freezer storage. Examination showed that the corn in about three quarters of the cans had an abnormal flavor. There was some good corn in these lots, but complete lack of coding rendered separations impossible. The lot as a whole had to be certified as out of condition.

On the other hand, flat sours in canned corn in one cannery were discovered but coding had been properly carried out. It was possible to isolate the flat sours to three very small lots. These were set aside and from the balance the canner was able to save a large quantity of unquestionable merchandise.

The Mechanics of Coding

Coding is easy to install and inexpensive to perform. The method of coding used will depend on the pack-



Why "High-Safety-Factor" Insulation means greater motor STAMINA

In step with modern design and manufacturing practice is the increasing use of Fiberglas High-Safety-Factor Insulation Material. There is a Fiberglas Electrical Insulation Material for virtually every insulation need.

Fiberglas provides a thin, strong, flexible, *inorganic* base for insulating impregnants. This better insulation material has a unique combination of desirable mechanical and electrical characteristics found in no other single material. It helps provide greater protection against the *enemies of insulation*—excessive moisture, oil, heat, overload, most corrosive acids and vapors and human carelessness—the causes of most motor burnouts and failures.

Because Fiberglas Insulation helps give motors greater stamina, engineers and maintenance men, in every industry, are specifying and standardizing on Fiberglas Electrical Insulation—realizing that even one motor failure can cause time and dollar losses far greater than the slightly higher initial cost of equipment insulated with Fiberglas.

Fiberglas is the trade name for these electrical insulation materials and many other products made from fine, strong, pliable, moisture and heat-resistant, ageless glass fibers.*

Write for catalog EL 44-7, containing complete information about the unique combination of characteristics which make Fiberglas a better electrical insulation material. Owens-Corning Fiberglas Corporation, Department 2009, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario

ASK FOR FIBERGLAS—IN YOUR NEXT MOTOR—AND ON YOUR NEXT REWIND

OWENS-CORNING

FIBERGLAS

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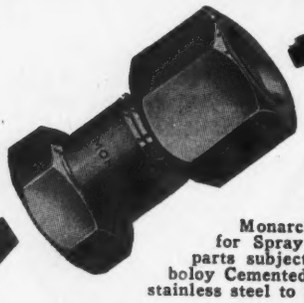
***OTHER FIBERGLAS PRODUCTS: Thermal Insulations • "Dust-Stop" Air-Filters • Fiberglas Yarns and Cloths • Fiberglas Mats**

SPRAY DRYING?

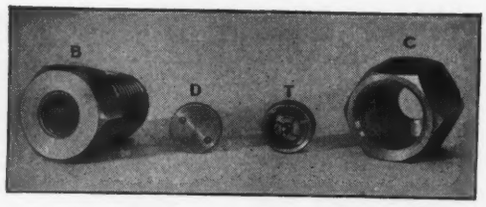


Do your present nozzles last as long as you think they should? Do they produce a fine, uniform powder over a relatively long period? Will they resist corrosion as well as erosion?

Monarch H-466 nozzles are specially designed for Spray Drying work, and, for long life, the parts subject to wear or erosion are made of Carboloy Cemented Carbide. Other parts are made of 18-8 stainless steel to resist corrosion.

Plants powdering milk, eggs, coffee, molasses, etc., report nozzle life of 50 to 100 times that of nozzles of ordinary materials. Think of the savings resulting from the elimination of "down" time alone!

Write for Catalog 6-A



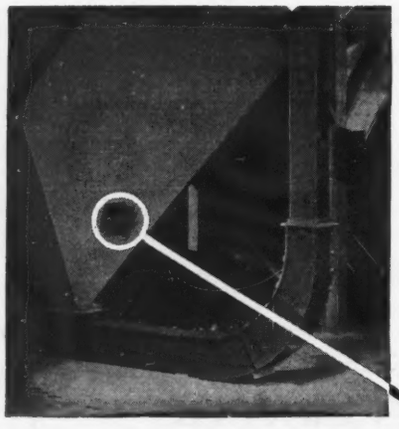
MONARCH MFG. WORKS, INC.

3307 Salmon St. Philadelphia 34, Pa.

SYNTRON

ELECTRIC VIBRATORS

MAKE STUBBORN, BULK MATERIALS FLOW FREELY THRU BINS, HOPPERS & CHUTES



3600 powerful "Electronic-Controlled" vibrations per minute, break down arching and plugging—without damage to prime equipment.

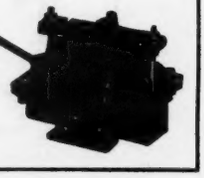
Eliminate pounding and sledging.

SAVE—

TIME, MONEY

AND LABOR

Write for catalog data.



SYNTRON COMPANY

460 LEXINGTON AVE. HOMER CITY, PA.

age and on the information to be coded. This will vary according to each processor's particular needs. The methods of coding may be classified as follows:

1. On cans:
   a. Conventional automatic dies used in canneries for embossing lids.
   b. Rubber stamp. Can be automatic, but most often applied by hand. Very common on large tins used for freezing.
   c. Stencils.
2. On labels especially labels of bottled goods:
   a. Rubber stamps.
   b. Perforations through the label, done by machine.
   c. Notches cut in the edge of the label, by machine or manually.
3. On cases:
   a. Automatic coding unit on sealer.
   b. Stencils or rubber stamps.

Whether or not the containers within the case are coded, the cases should be. Often it becomes necessary to separate out a single code from a lot of several codes. A code on the case will obviate the necessity of breaking open all the cases. Cases are frequently marked with rubber stamps. Sometimes numbered paper stickers are fastened on cases. The waxed carton employed in the quick frozen industry does not lend itself to coding. Most frozen goods in cartons are coded by marking the cases only. Coding only on the case however, is not recommended. Much better control and protection is afforded by having code marks on all containers.

The label itself may be a code mark. Some packers use a different label for each grade and do their labeling at time of packing. This method, however, does not permit breaking down of the lots into small enough size for proper protection.

Types of Markings

The markings used in coding are various. For rubber stamping and die embossing, numbers, letters, and symbols, such as *,), △ and — are used. In the key to the code, variations may be made not only by changing the mark in each position, but also by changing its position. The position of a blank space may be equally significant. Symbols are not recommended because many cannot be reproduced by typewriters. Upside down codes are not desirable for the same reason. Color of ink used is another possible variation for rubber stamp codes. Label perforations sometimes form legible numbers or letters. Often the key to perforated labels lies in the position of the dots. Where coding is done by notching the edge of the labels, the key lies in the measured distance between notches, in their groupings or in their location in relation to the label design.

GOVERNMENT-OWNED
VEGETABLE CURING PLANT
and
DEHYDRATING EQUIPMENT
For Sale or Lease

Fruitland, Md. (Plancor 1888)
John H. Dulany & Son (Lessee)
(Curing Plant)

GOVERNMENT OWNED
SURPLUS PLANTS

Approximately 3/5 acre, 20 year lease. Brick and tile building, rock wool insulated, 27,250 sq. ft. Heating coils installed under wood slat floor and steam supplied by others. Water well on site. Electric service by local utility.

Fruit and Vegetable Dehydrating Equipment (Department of Agriculture Facilities)

Installed in leased building. Capacity 1,500,000 dry pounds per 200 days. Miller counter-flow twin tunnel with 110 trucks; 2 stage pre-dryer; 2,816 drying traps; blancher; vegetable cutter; and accessory equipment, driving motors, instruments, piping, wiring, etc. This equipment available after June 26, 1946.

CREDIT TERMS MAY BE ARRANGED FOR THE PURCHASE OF THIS PLANT

The War Assets Administration, a disposal agency, invites proposals for the purchase or lease of the above property in the interest of continued employment. This plant was acquired by an agency of the Government for production in the war effort, and has been declared surplus to Government needs. Listing of this plant by name of lessee is for identification purposes only, and has no connection with the lessee's own plants or facilities. General information is available from your nearest War Assets Administration Office. For specific data contact the office indicated below. All data contained herein are necessarily abbreviated and subject to correction. They are not intended for use as a basis for negotiation. WAR ASSETS ADMINISTRATION reserves the unqualified right to reject any or all proposals or offers received for the above property.

Address all inquiries and proposals to:

WAR ASSETS ADMINISTRATION

OFFICE OF REAL PROPERTY DISPOSAL

EAST END 4th STREET **RICHMOND 24, VIRGINIA**

In freezing fruits or vegetables, or ice-cream, or in the cold storage of farm and dairy products, fish or meat—extra profits are realized by increasing production, improving quality, preventing spoilage and reducing operating costs.

The Niagara "No-Frost" Method prevents cooling coils from icing, which insures constant full capacity, thus increasing production.

It quickly brings products to the correct temperatures, thus improving quality.

"No-Frost" Spray Coolers have capacity to hold refrigeration and product temperatures constant, thus preventing spoilage.

The "No-Frost" Method uses less power, thus reducing operating costs.

The Niagara "No-Frost" Method gives month after month trouble-free operation, thus eliminating major maintenance expense.

Write for descriptive bulletin No. 83 today.

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NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

Many food processors change code marks regularly but do not pay sufficient attention to planning the code. Some even change codes and system without proper notation in the code key book. There have been times when an early-season code mark has been inadvertently repeated later on. Occasionally, an unfortunate code will be made, such as on some canned tomatoes, which were plainly coded "ROTS" in handsomely embossed capital letters. On rare occasions one encounters over-zealous coding where there are so many tiny lots of different codes that the whole thing is unwieldy. A good coding system should be carefully planned and rigidly followed.

The intelligent formulation and careful application of a coding system costs little but pays generous dividends.

—End—

New Products in Candy

(*Continued from page* 76)

The flavor of raw peanut products after precooking in sirup was equal to that of the same products after roasting by dry heat.

Summary

Oil-seed, cereal, and legume products, which are sources of protein, fat, carbohydrates, minerals, and vitamins, were incorporated into experimental nougat, caramel, fudge, creams, coconut pieces and hard candies. It was found that from four to seven percent of pulverized products derived from wheat, cottonseed, soybeans, and peanuts could be incorporated into nougat, caramel, and fudge without greatly changing the usual characteristics of these candies. Most of the experimental ingredients possessed flavors, which limited the amounts that could be incorporated into particular types of candy.

Varying amounts of the vitamins, thiamin, riboflavin and niacin were added to candies by the special ingredients. Assays made on stored candies showed that thiamin and riboflavin were well retained for 180 days or longer at 74 to 80 deg. F. and 55 percent relative humidity.

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